

# Dictionary of Music



*Ut psallendi materiem discerent.*  
Martian. Cap.<sup>1</sup>

## Preface

Music is, of all the fine Arts, the one whose Vocabulary is the most extensive, and for which a Dictionary is, consequently, the most useful. Thus, this one should not be classed among those ridiculous compilations multiplied each day by the fashion or rather the mania for Dictionaries. If it is bad, this is neither for the choice of subject nor for the form of the work. Thus, it would be wrong to be put off by its title. One must read it in order to judge it.

The utility of the subject does not, I admit, establish that of the Book; it justifies me solely for having undertaken it, and this is also all I can claim; for, moreover, I feel quite acutely what is wanting in its execution. Here you have less a Dictionary in form than a collection of materials for a Dictionary, which await only a better hand to be utilized. The basis of this Work was dashed off in such haste, fifteen years ago, in the *Encyclopedia*, that, when I wanted to take it up again as a work, I could not give it the solidity it might have had if I had had more time to digest its plan and to execute it.

I did not conceive of this enterprise on my own, it was proposed to me; it was added that the entire manuscript of the *Encyclopedia* had to be complete before a single line of it would be printed; I was given only three months to fulfill my task, and three years could scarcely have sufficed to read, extract, compare, and compile the Authors I required; but the zeal of friendship blinded me to the impossibility of success. Faithful to my word, I wrote quickly and badly, at the expense of my reputation, not being able to do it well in such a short time; at the end of three months my entire manuscript was written, neatly drafted, and delivered; I have not seen it since. If I had worked from volume to volume as the others did, this attempt, better digested, might have remained in the condition into which I would have put it. I do not regret having been punctual; but I do regret having been reckless, and having promised more than I could perform.

Increasingly distressed by the imperfection of my articles as the volumes of the *Encyclopedia* appeared, I resolved to recast the whole based upon my draft, and to make of it at leisure a separate work treated with more care. When I recommenced this labor, I was within reach of all the necessary help. Living in the midst of Artists and Literary People, I could consult them both. The Abbé Sallier furnished me the books and manuscripts I needed from the King's Library, and I often derived enlightenment more certain than my researches from my conversations with him.<sup>2</sup> I believe I owe to the memory of that decent and learned man a tribute of gratitude that all the Literary People whom he served will surely share with me.

My withdrawal to the country took all of these resources from me at the moment when I was beginning to take advantage of them. This is not the place to explain the reasons for this withdrawal:<sup>3</sup> it will be understood, from my fashion of thinking, that the hope of writing a good Book on Music was not one to hold me back. Far from the amusements of the City, I soon lost the tastes that related to it; deprived of the communication which might enlighten me concerning my old aim, I also lost all sight of it; and whether the Art or its theory have made progress since that time, because I was not within reach of finding out anything about this, I was no longer in a position to follow it. Convinced, nevertheless, of the utility of the labor I had undertaken, I applied myself to it from time to time, but always with less success, and always feeling that the difficulties of a Book of this type require, to conquer them, enlightenment which I was no longer in a position to acquire, and a warmth of interest which I had ceased to put into it. Finally, despairing of ever being within reach of doing better, and wanting to take leave forever of ideas from which my mind grew more and more distant, I occupied myself, in these Mountains, with gathering together what I had done in Paris and at Montmorency;<sup>4</sup> and, from this undigested mass has resulted a Dictionary of the sort seen here.

This review seemed necessary to me to explain how circumstances have forced me to bring out a Book in such poor condition that I might have done better with the assistance I was deprived of. For I have always believed that the respect one owes to the Public is not to tell it insipid things, but to tell it only what is true and useful, or at least what one judges to be such; not to present anything to it without having given to it all the care one is capable of, and to believe that in doing one's best, one never does well enough for it.

I did not believe, nonetheless, that the imperfect condition in which I was forced to leave this work ought to prevent me from publishing it; since a Book of this type is useful to the Art, it is infinitely easier to write a

good one based on the one I am presenting than it is to begin by creating everything. The knowledge requisite for this is perhaps not extremely great, but it is extremely varied, and is rarely found united in the same brain. Thus, my compilations may spare those who are in a position to put them in the necessary order a great deal of labor; and by noting my errors, someone who is able to write an excellent Book might never do as well without mine.

I therefore warn those who want to permit only well-written Books not to undertake the reading of this one; they would soon be put off: but those whom the bad does not turn away from the good; those who are not so preoccupied by faults that they count as nothing what redeems them; those, finally, who will wish to seek here something to compensate for my own, they will perhaps find in it enough good articles to tolerate the bad ones, and, even in the bad ones, enough new and true observations to make worthwhile the trouble of sifting through and choosing among the rest. Musicians read little, and I nevertheless know few Arts where reading and reflection are more necessary. I thought that a Work in the form of this one would be precisely what would suit them, and that, in order also to make it as profitable as possible to them, it was necessary less to tell them what they knew than what they might need to learn.

If Unskilled Laborers and Note-Scrapers often set aright errors here, I hope that true Artists and men of genius will find in it useful views which they will know how to take advantage of. The best Books are those which the Vulgar decry, and from which talented people profit without speaking about them.

After having set forth the reasons for the mediocrity of the Work and those for the utility I deem can be drawn from it, I might now enter into the detail of the Work itself, give a precis of the plan I have traced out for myself and of the manner in which I have tried to follow it. But in proportion as the ideas related to it have been effaced from my mind, so the plan according to which I arranged them has likewise been effaced from my memory. My initial plan was to treat my articles in close connection with one another, to link the results so closely together by cross-references, that, along with the convenience of a Dictionary, the whole would have the advantage of a coherent Treatise; but in order to execute this plan, it would have been necessary to have kept all the parts of the Art present to my mind, and not to have treated any of them without remembering the others—which the lack of resources and my tepid taste soon made impossible for me, and which I might even have had trouble doing amidst my first guides and full of my initial fervor. Abandoned to myself alone, no longer having either Scholars or Books to consult, consequently forced to

treat each article in itself and without regard to those related to it, I would have had to make numerous repetitions so as to avoid gaps. But I believed that in a Book of this type it was still a lesser evil to commit faults than to make omissions.

I therefore adhered above all to completing the Vocabulary fully, and not only to not omitting any technical term, but sometimes to passing beyond the limits of the Art rather than not always reaching them. And this made it necessary for me frequently to sprinkle this Dictionary with Italian words and Greek words: the first so consecrated by usage that it is necessary to understand them even in practice; the second, adopted in the same way by many Scholars, and for which, given the desuetude of what they express, synonyms could not be given in French. I have tried, nevertheless, to confine myself to my rule, and to avoid the excess of Brossard,<sup>5</sup> who, while producing a French Dictionary, makes its Vocabulary wholly Italian, and swells it with words absolutely foreign to the Art he treats. For, who would ever imagine that *Virgin*, *Apostles*, *Mass*, *Dead* were Musical terms since there are types of Music relative to what they express, that these other words, *Page*, *Leaflet*, *Four*, *Five*, *Throat*, *Reason*, *Already*, were also technical terms since they are sometimes used when speaking of the Art?

As for the parts that relate to the Art without being essential to it, and which are not absolutely necessary to the understanding of the rest, I have avoided entering into them as much as I could. Such is that of Musical Instruments, a vast part and one that would alone fill a Dictionary, especially in relation to the Instruments of the Ancients. M. Diderot was charged with this part in the *Encyclopedia*, and as it did not enter into my initial plan, I was careful not to add it in the succeeding one, after having felt so keenly the difficulty of executing this plan as it was.

I have treated the Harmonic part in accordance with the system of the Fundamental Bass, even though, imperfect and defective in so many regards, it is not at all, in my opinion, that of Nature and of truth, and even though a muffled and confused padding results from it rather than a good Harmony. But, in the end, it is a system; it is the first, and it was the only one until M. Tartini's,<sup>6</sup> in which those multitudes of isolated rules that might seem to be arbitrary were tied together, by principles, and which made of the Harmonic Art a study of memory rather than of reasoning. Since M. Tartini's system, although better in my view, is still not as widely known, and does not have the same authority as M. Rameau's, at least in France, it should not have been substituted for it in a Book destined principally for the French Nation. I have therefore contented myself with presenting the principles of this system as best as I can in an article in my Dictionary;<sup>7</sup> and furthermore, I believed I owed this deference to the Na-

tion for which I wrote, to prefer its sentiment to my own concerning the basis of the Harmonic doctrine. I nevertheless ought not to have refrained, upon the proper occasion, from objections necessary for the understanding of the articles I had to treat; it would have been to sacrifice the utility of the book to the prejudices of the Readers; it would have been to flatter without instructing, and to transform deference into fawning.

I exhort Artists and Enthusiasts to read this Book without mistrust, and to judge it with as much impartiality as I put into writing it.<sup>8</sup> I beg them to consider that as I was not preaching, I had no other interest here than that of the Art, and if I had, I should naturally lean in favor of French Music, in which I might attain a place, against the Italian, in which I can be nothing. But sincerely seeking the progress of an Art I loved passionately, my pleasure silenced my vanity. My first habits have long attached me to French Music, and I was openly its enthusiast. Attentive and impartial comparisons carried me toward Italian Music, and I have abandoned myself to it with the same good faith. If I have sometimes joked, it was in order to respond to others in their same tone; but I have not, like them, delivered witty sayings as my entire proof, and I have joked only after having reasoned. Now that misfortunes and evils have finally detached me from a taste that had only too much dominion over me, I persist, by the love of the truth alone, in my judgments, which the love of the Art alone have induced me to make. But, in a Work such as this one, dedicated to Music in general, I know only one that, not being of any country, is that of all; and I have never entered into the quarrel over the two Musics except when it was a matter of clarifying some important point for common progress. I have committed numerous faults, doubtless; but I am certain that partiality has not made me commit a single one. If this is wrongly imputed to me by the Readers, what can I do about it? It is then they who do not want my book to be good for them.

If one sees some unimportant articles in other Works that are also in this one, those who might be able to note this will want to recall that, since the year 1750, the manuscript has left my hands without my knowing what has become of it since that time. I accuse no one of having taken my articles; but it is not just for others to accuse me of having taken theirs.<sup>9</sup>

Môtiers-Travers, 20 December 1764.

ACCENT [*Accent*]. Thus is called, according to the most general acceptance, every modification of the speaking voice with regard to its duration, or to the tone of the syllables and of the words of which the discourse is

composed—which shows a very exact relationship between the two uses of *Accents* and the two parts of Melody, namely Rhythm and Intonation. *Accentus*, says the Grammarian Sergius in his commentary on Donatus, *quasi ad cantus*.<sup>10</sup> There are as many different *Accents* as there are manners of thus modifying the voice; and there are as many genres of *Accents* as there are general causes of these modifications.

Three of these genres are distinguished in simple discourse, namely: grammatical *Accent*, which encompasses the rule for *Accents* properly speaking, by which the Sound of syllables is low or high, and that of the quantity by which each syllable is short or long; logical or rational *Accent*, which some inappropriately confuse with the preceding one, this second sort of *Accent*, indicating the relationship, the greater or lesser connection which propositions and ideas have with one another, is marked in part by punctuation; finally, pathetic or oratorical *Accent*, which, by various inflections of the voice, by a more or less elevated tone, by a more lively or slower speech, expresses the feelings by which the one who is speaking is agitated and which he communicates to those who listen to him. The study of the various *Accents* and of their effects in language should be the great business of the Musician, and Dionysius of Helicarnassus reasonably regards *Accent* in general as the germ of every Music.<sup>11</sup> In addition, we should admit as an incontestable maxim that more or less *Accent* is the true cause that makes languages more or less musical: for what would the relationship of Music to discourse be if the tones of the singing voice did not imitate the *Accents* of speech? From which it follows that the less a language has such *Accents*, the more its Melody must be monotonous, slack, and insipid, at least if it doesn't seek in noise and the force of sounds the charm it cannot find in their variety.

With regard to pathetic and oratorical *Accent*, which is the most immediate object of the imitative Music of the theater, it should not be said in opposition to the maxim I have just established that since all men are subject to the same passions they must likewise possess their language: for the universal *Accent* of Nature which draws from every man inarticulate cries is one thing, and the *Accent* of the Language which engenders the Melody peculiar to a Nation is another. The sole difference of more or less imagination and sensitivity which is observed from one people to another must introduce an infinity of differences into the accented idiom, if I dare speak in this way. The German, for example, raises his voice equally and strongly in anger; he always cries out in the same tone. The Italian, who is rapidly and successively agitated in the same case by a thousand different emotions, modifies his voice in a thousand ways. The same basis of passion reigns in his soul; but what a variety of expressions in his *Accents* and

in his language! Now, it is to this variety alone, when the Musician causes it to be imitated, that he owes the energy and the grace of his song.

Unfortunately, all these various *Accents*, which agree perfectly in the Orator's mouth, are not so easy to reconcile under the Musician's pen, already so hampered by the peculiar rules of his Art. It cannot be doubted that the most perfect, or at least the most expressive, Music would be that in which all the *Accents* were observed most precisely; but what makes this combination difficult is that too many rules in this Art are liable to contradicting one another, and to contradicting one another all the more in proportion as the language is less musical; for none of them is perfectly so: otherwise those who make use of them would sing instead of speaking.

This extreme difficulty in following the rules of all the *Accents* at the same time therefore often obliges the Composer to give preference to one or another of them, according to the various genres of Music with which he is dealing. Thus, Dance tunes in particular require a rhythmic and Cadenced *Accent*, whose character in each Nation is determined by the language. The grammatical *Accent* should be the first consulted in Recitative so as to make the articulation of the words—subject to being lost by the quickness of the flow—more perceptible in the harmonic resonance. But the passionate *Accent*, in its turn, holds sway in dramatic Arias. And both are subordinated, especially in Instrumental Pieces, to a Third sort of *Accent* which could be called musical and which is in some manner determined by the type of Melody which the Musician wants to adopt to the words.

In actuality, the first and the principal object of all Music is to please the ear; thus, every Aria should have a pleasant song. This is the first law, which it is never permitted to break. One should therefore consult primarily the Melody and the musical *Accent* in the design of any Aria whatsoever. Then, if it is a question of a dramatic and imitative song, one must seek the pathetic *Accent*, which gives its expression to the feeling, and the rational *Accent*, by which the Musician renders the ideas of the Poet with exactness. For in order to inspire others with the warmth with which we are animated when speaking to them, they must be made to hear what we are saying. The grammatical *Accent* is necessary for the same reason; and this rule is no less indispensable than the two preceding ones for being the last in order here, since the meaning of propositions and of phrases absolutely depends on that of the words. But the Musician who writes his own language rarely has need of thinking of this *Accent*; he cannot sing his Aria without perceiving whether he speaks correctly or incorrectly, and it suffices for him to know that he should always speak correctly. How fortunate, nonetheless, when a flexible and flowing Melody never ceases to lend



itself to what the language requires! French Musicians in particular have aids that render their errors on this point unpardonable, and especially the treatise on French Prosody by M. the Abbé d'Olivet, which they should all consult.<sup>12</sup> Those who are in a position to ascend higher can study the Port-Royal Grammar and the learned notes of the Philosopher who has commented upon it.<sup>13</sup> Then, by resting usage on rules and rules on principles, they will always be sure of what they should do in using grammatical *Accent* of every type.

As for the two other types of *Accents*, they are less subject to being reduced to rules, and their use demands less study and more talent. One does not find the language of the passions by keeping one's head, and it is a hackneyed truth that one must oneself be moved in order to move others. In the search for the pathetic *Accent*, therefore, nothing can take the place of that genius which awakens all the feelings at will, and there is no other Art in this part than that of kindling in one's own heart the fire which one wants to carry into that of others. (See GENIUS\* [*Génie*].) Is it a question of the rational *Accent*? Art has altogether little hold to grasp it for same the reason that the deaf cannot be taught to hear. It must also be admitted that this *Accent*, less so than the others, falls within the competence of Music because it is much more the language of the senses than that of the mind. Therefore give the Musician many images or feelings and a few simple ideas to render: for it is only the passions that sing; the understanding does nothing but speak.

AIR or TUNE [*Air*].<sup>14</sup> A Song adapted to the words of a Chanson, or to a short Piece of Poetry appropriate for being sung, and, by extension, the Chanson itself is called an *Air*.

In Operas the name *Airs* is given to all measured Songs in order to distinguish them from the Recitative, and one generally calls an *Air* any complete portion of vocal or instrumental Music forming a Song, whether that portion alone makes up an entire Piece or it can be detached from the whole of which it makes up a part and be performed separately.

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The *Airs* of our Operas are, so to speak, the canvas or the basis on which the pictures of imitative Music are painted; Melody is the design, Harmony is the coloration; all the picturesque objects of beautiful nature,<sup>15</sup> all the pondered feelings of the human heart are the models which the Artist imitates; attention, interest, the charm of the ear, and the emotion of the heart, are the aim of these imitations. (See IMITATION\* [*Imitation*].) A



learned and pleasant *Air*, an *Air* found by Genius and composed by Taste, is the masterpiece of Music; it is there that a beautiful voice develops, that a beautiful Instrumental piece shines; it is there that passion imperceptibly succeeds in moving the soul by the senses. After a beautiful *Air*, one is satisfied, the ear desires nothing more; it remains in the imagination, one carries it with oneself, one repeats it at will; without being able to render a single Note of it, one performs it in one's head such as it was heard at the Theater; one sees the Scene, the Actor, the Theater; one hears the accompaniment, the applause. The genuine Enthusiast never loses the beautiful *Airs* he hears throughout his life; he makes the Opera begin anew when he wishes.

The words of *Airs* do not always form a continuous meaning, are not recited like those of the Recitative; although usually quite short, they are broken up, repeated, transposed at the Composer's pleasure. They do not make up a narration that moves along; they depict either a picture that must be seen from various points of view, or a feeling in which the heart takes pleasure, from which it cannot, so to speak, detach itself, and the various phrases of an *Air* are only so many ways of envisioning the same image. This is why the subject should be a unity. It is by those quite extensive repetitions, it is by those redoubled blows that an expression which cannot move you initially finally sways you, agitates you, transports you outside of yourself, and it is also by the same principle that Roulades, which seem so misplaced in pathetic *Airs*, are nevertheless not always so: the heart, pressed by a very lively feeling, often expresses it more vividly by inarticulate Sounds than by words. (See NEUMA [*Neume*].)

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SONG or SINGING [*Chant*], *n. masc.* A sort of modification of the human voice, by which one forms varied and discernible Sounds. Let us observe that in order to give this definition all the universality it should have, one must understand by *discernible Sounds* not only those that one can assign by the Notes of our Music, and produce by the keys of our Keyboard, but all those whose Unison can be found or felt and whose Intervals can be calculated in any way whatsoever.

It is very difficult to determine in what manner the voice that forms speech differs from the voice that forms *Song*. This difference is perceptible, but what it consists in is not very clearly seen, and when it is sought, it is not found. M. Dodart has made anatomical observations thanks to which he truly believes to find the cause of these two sorts of voices in the various conformations of the Larynx.<sup>16</sup> But I do not know whether these

observations, or the conclusions he draws from them, are very certain. (See VOICE\* [*Voix*].) It seems that the Sounds that form speech lack only permanence to form a genuine *Song*; it also appears that the various inflections given to the voice when speaking form Intervals that are not at all harmonic, that do not make up part of our systems of Music, and that, consequently, since they cannot be expressed in Notation, are not properly speaking *Song* for us.

*Song* does not seem to be natural to man. Although the Savages of America sing, because they speak, the true Savage never sang. Mutes do not sing at all; they form only voices without permanence, muted howls which need wrests from them. I would doubt that Master Pereira,<sup>17</sup> with all his talent, could ever draw any musical *Song* from them. Children scream, cry, and do not at all sing. The first expressions of nature have nothing melodious and sonorous about them, and they learn to Sing as they do to speak, after our example. Melodious and discernible *Song* is only a calm and artificial imitation of the accents of the speaking or passionate Voice; one cries and one complains without singing, but one imitates cries and complaints by singing, and as, of all imitations, the most interesting is that of the human passions, of all the manners of imitating the most pleasant is *Song*.

*Song*, applied more particularly to our Music, is its melodious part, that which results from the duration and the succession of Sounds, that on which all the expression depends, and to which the rest is subordinated. (See MUSIC\* [*Musique*], MELODY\* [*Mélodie*].) Pleasant *Songs* are initially striking, they are easily engraved into the memory; but they are often the stumbling block of Composers, because only learning is needed to heap up Chords, and because talent is needed to imagine graceful *Songs*. In each nation there are trivial and well-worn phrases of *Song* into which bad Musicians constantly fall; there are baroque ones that are never used, because the Public always rebuffs them. To invent new *Songs* belongs to the man of genius; to find beautiful *Songs* belongs to the man of taste.

Finally, in its most restricted sense, *Song* is said solely of vocal Music, and when combined with Instrumental Parts those which are destined for Voices are called *Singing* Parts.

COMPOSER [*Compositeur*], *n. masc.* Someone who composes Music or who knows the rules of Composition. See an explanation of the knowledge necessary to know how to compose at the word COMPOSITION\* [*Composition*]. This is still not enough to form a true *Composer*. All the learning possible does not at all suffice without the genius that puts it to work. Whatever effort one might make, whatever experience one might

have, it is necessary to be born for this Art; otherwise one will never write anything but what is mediocre. It is the same for the *Composer* as for the Poet: if Nature does not form him such at birth:

*If he has not received from Heaven the secret influence,  
For him Phoebus is deaf and Pegasus restive.*<sup>18</sup>

What I mean by genius is not at all that bizarre and capricious taste that everywhere sows the baroque and the difficult, that knows how to ornament the Harmony by dint of Dissonances, contrasts, and noise. It is that interior fire that burns, that torments the *Composer* despite himself, that constantly inspires him with new and always pleasant Songs, with expressions that are lively, natural, and that always penetrate to the heart, with a pure, touching, majestic Harmony that strengthens and adorns the Song without stifling it. It is this divine guide that led Corelli, Vinci, Perez, Rinaldo, Jomelli, Durante, more learned than them all, into the sanctuary of Harmony; Leo, Pergolesi, Hasse, Terradeglias, Galuppi into that of good taste and of expression.<sup>19</sup>

COMPOSITION [*Composition*], *n. fem.* This is the Art of inventing and of writing Songs, of accompanying them with a suitable Harmony, in a word, of producing a complete Piece of Music with all its Parts.

The knowledge of Harmony and of its rules is the foundation of *Composition*. Doubtless it is necessary to learn to fill out Chords, to prepare, to resolve Dissonances, to find Fundamental Bases, and to possess all the other paltry elementary knowledge; but with the rules of Harmony alone one is no closer to knowing *Composition* than one is to being an Orator with those of Grammar. I will not at all say that it is necessary, besides this, to be quite familiar with the range and the character of Voices and of Instruments, with Songs that are easy or difficult to perform, with what produces an effect and what does not, to feel the character of the different Meters, that of the different Modulations in order always to apply them both properly, to know all the specific rules established by convention, by taste, by caprice or by pedantry, as Fugues, Imitations, constrained subjects, *etc.* All these things are still merely preparations for *Composition*; but one must find in oneself the source of beautiful Songs, of grand Harmony, of Portraits, of expression; finally, to be capable of seizing upon or forming the ordering of the whole work, of following conventions of every type, and of filling oneself with the spirit of the Poet without amusing oneself by running after the words. It is with reason that our Musicians have given the name "words" to the Poems they put into Song. One sees clearly, by the way in which they render them, that for them they really

are merely words. It seems, especially for the last several years, that the rules for Chords have made them forget or neglect all the others, and that Harmony has acquired facility only at the expense of the Art in general. All our Artists know filling out, we have hardly any of them who know *Composition*.

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In a *Composition*, the Author has for his subject Sound physically considered, and for his object the pleasure of the ear alone, or rather he elevates himself to imitative Music and seeks to move his Listeners by moral effects. In the first regard, it is enough for him to seek beautiful Sounds and pleasant Chords; but in the second he should consider Music by its relations to the accents of the human voice, and by the possible conformities between harmonically combined Sounds and imitable objects. One will find in the article OPERA\* [*Opéra*] some ideas about the means of elevating and ennobling the Art, by making of Music a language more eloquent than discourse itself.

CONSONANCE [*Consonnance*], *n. fem.* Is, according to the etymology of the word, the effect of two or more Sounds heard at the same time; but the meaning of this term is usually restricted to the Intervals formed by two Sounds whose Accord<sup>20</sup> pleases the ear, and it is in this sense that I shall speak of it in this article.

Among that infinity of Intervals that can divide Sounds, there are only a very small number of them that make *Consonances*; all the others shock the ear and are for this reason called *Dissonances*. It is not that a number of these are not employed in Harmony, but they are so only with precautions of which *Consonances*, always pleasant by themselves, do not have an equal need.

The Greeks accepted only five *Consonances*; namely, the Octave, the Fifth, the Twelfth—which is the replica of the Fifth, the Fourth, and the Eleventh—which is the replica of the Fourth. We add to this major and Minor Thirds and Sixths, doubled and tripled Octaves, and, in a word, the various replicas of all these without exception, in accordance with the entire extent of the system.

*Consonances* are distinguished into perfect or just, whose Interval does not vary at all, and into imperfect ones, which can be major or minor. Perfect *Consonances* are the Octave, the Fifth, and the Fourth; Imperfect ones are Thirds and Sixths.

*Consonances* are further divided into simple and complex. The only sim-

ple *Consonances* are the Third and the Fourth: for the Fifth, for example, is made up of two Thirds; the Sixth is made up of a Third and a Fourth, etc.

The physical character of *Consonances* is derived from their production in a single Sound; or, if one likes, from the vibration of strings. Of two strings in close accord, forming between them an Interval of an Octave or of a Twelfth, which is the Octave of the Fifth, or of the Seventeenth, which is the double Octave of the Major Third, if the lower one is made to be sounded, the other vibrates and resonates. With regard to the major and Minor Sixth, the Minor Third, the simple Major Fifth and Third, which are all combinations and inversions of the preceding *Consonances*, they are not found directly, but among the various strings that vibrate to the same Sound.

If I play the string *Do*, the strings raised to its Octave *do*, to the Fifth *sol* of this Octave, to the Third *mi* of the double Octave, even to the Octaves of all these, all vibrate and resonate simultaneously; and if the first string were alone sounded, one would still distinguish all these Sounds in its resonance. Here, then, are the direct Octave, Major Third, and Fifth. The other *Consonances* are also found by combinations; namely, the Minor Third from the *mi* to the *sol*; the Minor Sixth from the same *mi* to the *do* above it; the Fourth from *sol* to this same *do*; and the Major Sixth from the same *sol* to the *mi* above it.

Such is the generation of all the *Consonances*. It would be a matter of accounting for the Phenomena.

First, the vibration of strings is explained by the action of the air and the concurrence of the vibrations. (See UNISON [*Unisson*].) 2nd. That the sound of a string is always accompanied by its Harmonics (See this word), seems a property of Sound which depends upon its nature, which is inseparable from it, and which can be explained only with hypotheses that are not without their difficulties. The most ingenious that has been imagined until the present concerning this matter is, unquestionably, M. de Mairan's, which M. Rameau says he has used to his advantage.<sup>21</sup>

3rd. With regard to the pleasure that *Consonances* cause for the ear to the exclusion of every other Interval, the source is clearly seen in their generation. *Consonances* all arise from the Perfect Chord, produced by a unique Sound, and the Perfect Chord is reciprocally formed by the assemblage of *Consonances*. It is therefore natural that the Harmony of this Chord is communicated to its Parts; that each of them participate in it, and that every other Interval that does not make up part of this Chord does not participate in it. Now, Nature, which has endowed the objects of each sense with qualities proper for flattering it, has wanted every Sound whatsoever to be accompanied by other pleasant Sounds, as it has wanted a ray of light

always to be formed of the most beautiful colors. If one presses the question, and one asks further from whence arises the pleasure that the Perfect Chord causes for the ear, whereas it is shocked by the concurrence of every other Sound, what can be responded to this, except to ask in one's own turn why green rather than gray delights the sight, and why the perfume of a rose enchants whereas the odor of the poppy displeases?

Haven't Physicists explained all this—and what do they not explain? But how conjectural all these explanations are, and how little solidity is found in them when they are closely examined! The Reader will pass judgment on this through an explanation of the principles, which I shall try to do in a few words.

They say, then, that since the sensation of the Sound is produced by the vibrations of the sounding body propagated to the tympanum by those the air receives from that same body, when two Sounds are heard together the ear is simultaneously affected by their different vibrations. If these vibrations are isochronic, that is, if they accord simultaneously at the beginning and end, this concurrence forms the Unison, and the ear, which grasps the Accord of these equal and very concordant recurrences, is pleasantly affected by it. If the vibrations of one of these two Sounds are twice the duration of those of the other, during each vibration of the lower one, the higher will make precisely two of them, and on the third they will start off together. Thus, every second one, every odd vibration of the higher will concur with every vibration of the lower, and this frequent concordance which constitutes the Octave, which according to them is less sweet than Unison, will be more so than any other *Consonance*. After this comes the Fifth, wherein one of the Sounds makes two vibrations whereas the other makes three of them, in such a way that they are in accord only at every third vibration of the higher one; then the double Octave, wherein one of the Sounds makes four vibrations while the other makes only one of them, being in accord only at every fourth vibration of the higher one; as for the Fourth, its vibrations correspond every fourth for the higher and every third for the lower; those of the Major Third are as 4 and 5, of the Major Sixth as 3 and 5, of the Minor Third as 3 and 6, and of the Minor Sixth as 5 and 8. Beyond these numbers it is only their multiples that produce *Consonances*, that is, Octaves of these; all the rest are dissonant.

Others, finding the Octave more pleasant than Unison, and the Fifth more pleasant than the Octave, give as a reason for this that the equal returns of the vibrations in the Unison and their too frequent concurrence in the Octave confound, identify the Sounds and prevent the ear from discerning their diversity. As much as one may, with pleasure, compare Sounds, it is quite necessary, they say, for the vibrations to accord by In-

tervals, but not for them to be confounded too often, otherwise, instead of two Sounds, one would believe that one hears only one of them, and the ear would lose the pleasure of the comparison. It is in this way that, from the same principle, one deduces the for and the against at one's pleasure, as one judges the experience requires it.

But first, one sees, this whole explanation is founded only on the pleasure it is claimed the soul receives by the organ of hearing from the concurrence of vibrations—which, at bottom, is only pure supposition. Furthermore, in order to justify this system it must further be assumed that the first vibration of each of the two sounding bodies begins exactly with that of the other; for however little the one precede it, they would no longer ever concur in the determined ratio, perhaps they never would concur, and consequently the perceptible Interval must change; the *Consonance* would no longer exist or would no longer be the same. Finally, it must be assumed that the different vibrations of the two Sounds of one *Consonance* strike the organ without confusion, and transmit to the brain the sensation of the Chord without mutually interfering with one another: a difficult thing to conceive of and which I shall have occasion to speak of elsewhere.

But without disputing about so many assumptions, let us see what must follow from this system. The vibrations or the Sounds of the last *Consonance*, which is the Minor Third, are as 5 and 6, and their Accord is extremely pleasant. What must naturally result from two other Sounds whose vibrations would be to one another as 6 and 7? A *Consonance* a little less harmonious, it is true, but still pleasant enough, due to the smallness of the difference of the ratios; for they differ only by a thirty-sixth. But tell me how it can be that two Sounds, of which the first makes five vibrations whereas the other makes six of them, produces a pleasant *Consonance*, and that two Sounds, of which the first makes six vibrations while the other makes seven of them, produces a Dissonance that is as harsh. What! In the first of these ratios the vibrations are in accord every sixth, and my ear is charmed, in the other they are in accord every seventh and my ear is flayed? I ask further how it happens that after this first Dissonance the harshness of the others does not increase by reason of the complexity of the ratios? Why, for example, is the Dissonance which results from the ratio of 89 to 90 not much more shocking than that which results from the ratio of 12 to 13? If the more or less frequent recurrence of the concurrence of the vibrations were the cause of the degree of pleasure or of pain which the Chords produce in me, the effect would be proportioned to this cause, and I do not find any such proportion. Thus, this pleasure and this pain do not at all come from this.



It still remains to attend to the alterations of which a *Consonance* is susceptible without ceasing to be pleasant to the ear, even though these alterations wholly disrupt the periodic concurrence of the vibrations, and even though this concurrence even becomes rarer in proportion as the alteration is smaller. It remains to consider why the Accord of the Organ or of the Harpsichord should offer to the ear only a cacophony that is all the more horrible in proportion as these Instruments are more carefully tuned, since, excepting the Octave, no *Consonance* is found in its exact ratio.

Will it be said that a ratio that is approached is assumed to be as entirely exact, that it is received as such by the ear, and that it supplies by instinct what it is lacking in the exactness of the Accord? I then ask why this unevenness of judgment and of discernment, by which it accepts ratios that are more or less approached, and rejects others in accordance with the different nature of the *Consonances*? In Unison, for example, the ear does not supply anything; it is just or false, nothing in between. It is also likewise for the Octave: if the Interval is not exact, the ear is shocked; it does not admit of any approximation. Why does it allow more in the Fifth and less in the Major Third? A vague explanation, without proof, and, contrary to the principle one wants to establish, does not account for these differences at all.

The Philosopher who gave us the principles of Acoustics, leaving aside all these concurrence of the vibrations, and renewing Descartes' system in this regard, accounts for the pleasure that *Consonances* cause for the ear by the simplicity of the ratios between the Sounds that form them.<sup>22</sup> According to this Author, and according to Descartes,<sup>23</sup> the pleasure diminishes in proportion as these ratios become more complex, and when the mind no longer grasps them, they are genuine Dissonances; thus, it is an operation of the mind which they take for the principle of the feeling for Harmony. Moreover, although this hypothesis agrees with the result of the first harmonic divisions, and although it even extends to other phenomena noted in the fine Arts, as it is subject to the same objections as the preceding one, it is not possible for reason to be contented with it.

Of all these, that which appears most satisfying has for its Author M. Estève, of the Royal Society of Montpellier.<sup>24</sup> Here below is how he reasons.

The feeling for the Sound is inseparable from that of its Harmonics, and since every Sound carries with it its Harmonics or rather its Accompaniment, this same Accompaniment is in the ordering of our organs. In the simplest Sound there is a gradation of sounds which are both weaker and higher, which soften the principal Sound by nuances, and make it lose the highest Sounds due to its great speed. This is what a Sound is; the Accom-

paniment is essential to it, by producing its softness and melody. Thus, every time this softening, this Accompaniment, its set of harmonics is strengthened and better developed, the Sounds will be more melodious, the nuances better supported. This is a perfection, and the soul must be sensitive to it.

Now, *Consonances* have this property, that when the Harmonics of each of the two Sounds concur with the Harmonics of the other, these Harmonics mutually support one another, become more appreciable, last longer, and thus make the Accord of the two Sounds that produce them more pleasant.

In order to make the application of this principle clearer, M. Estève has set up two Tables, the first of *Consonances*, the other of Dissonances according to the ordering of the Scale; and these Tables are so arranged that one sees in each the concurrence or the opposition of the Harmonics of the two Sounds that form each Interval.

By the Table of the *Consonances* one sees that the Chord of the Octave preserves almost all its Harmonics, and this is the reason for the identity that is conceived in the practice of Harmony between the two Sounds of the Octave; one sees that the Fifth Chord preserves only three Harmonics, that the Fourth preserves only two of them, that, finally, imperfect *Consonances* preserve only one of them, except the Major Sixth, which carries two of them.

By the Table of the Dissonances one sees that they do not preserve any Harmonic sound for themselves, except the minor Seventh alone, which preserves its fourth Harmonic, namely, the Major Third of the third Octave of the high Sound.

From these observations, the Author concludes that the more concurrent Harmonics there are between two Sounds, the more their Accord will be pleasant, and these are the perfect *Consonances*. The more the Harmonics are destroyed, the less the soul will be satisfied by these Chords; these are the imperfect *Consonances*. Finally, if it so happens that no Harmonic is preserved, the Sounds will be deprived of their softness and their melody; they will be sharp and as if emaciated, the soul will not lend itself to them, and instead of the softness it experiences in *Consonances*, finding everywhere only a sustained coarseness, it will experience a feeling of restlessness, unpleasantness, which is the effect of the Dissonance.

This hypothesis is, without question, the simplest, the most natural, and the most felicitous of all; but it nevertheless leaves something to be desired for the mind's contentment, since the causes it assigns are not always proportional to the differences in the effects; since, for example, it confounds in the same category the Minor Third and the minor Seventh as

being equally reducible to a single Harmonic, although the first is *Consonant*, the other Dissonant, and their effect is very different for the ear.

With regard to the principle of Harmony imagined by M. Sauveur, and which he made consist in the Beats,<sup>25</sup> as it is in no way sustainable, and as it has not been adopted by anyone, I shall stop here, and it will be enough to refer the Reader to what I have said about it at the word BEATS [*Battemens*].

COPYIST [*Copiste*], *n. masc.* Someone who makes a profession of copying Music.

Whatever progress the Typographic Art has made, it has never been possible to apply it to Music with as much success as to writing, whether because, the tastes of the mind being more constant than those of the ear, one grows tired less quickly with the same books than with the same songs; or by the specific difficulties that the combination of Notes and of Lines adds to the printing of Music: for if one first prints the Staves and then the Notes, it is impossible to give the necessary exactness to their relative positions; and if the character of each Note depends on a portion of the Staff, as in our printed Music, the lines are arranged so poorly with respect to one another, such a prodigious number of characters are needed, the whole makes for such a nasty effect on the eye, that this manner has reasonably been abandoned to be replaced with engraving. But aside from the fact that engraving itself is not exempt from inconveniences, it always has that of multiplying the copies or the Parts too much or too little; of putting into the Score what some would like in the separate Parts, or in separate Parts what others would like in the Score, and of offering to the curious almost nothing but Music that is already old and has passed through everyone's hands. Finally, it is certain that in Italy, the country on earth where the most Music is composed, printed Notation has been proscribed for a long time without the use of engraving having been able to be established there; from which I conclude that in the judgment of the Experts simple *Copying* is the most convenient.

It is more important for Music to be clearly and correctly copied than for simple writing: because someone who reads and meditates in his study perceives, easily corrects the mistakes in his book, and because nothing prevents him from suspending his reading or from beginning it anew. But in a Concert where each sees only his own Part, and where the speed and the continuity of the playing does not leave the time to come back to any mistake, they are all irreparable; often a sublime piece is maimed, the playing is interrupted or even stopped, everything goes awry, togetherness and effectiveness are everywhere lacking, the Listener is put off and the Author dishonored by the fault of the *Copyist* alone.

Furthermore, the understanding of a difficult piece of Music depends a great deal on the manner in which it is copied; for aside from the clarity of the Notation, there are various means of presenting more clearly to the Reader the ideas that one wishes to depict for him and which he should produce. The copying of one man is often found to be more readable than that of another who nevertheless notates more agreeably; it is that the one wishes only to please the eyes, and the other is more attentive to useful concerns. The most skillful *Copyist* is the one whose Music is played with the greatest ease, without the Musician himself guessing why. All this has persuaded me that to explain the duty and the cares of a good *Copyist* in some detail was not to write a useless Article; everything that tends toward making playing easier is not at all indifferent for the perfection of an Art for which it is always the greatest pitfall. I perceive how much I am going to harm myself if my work is compared to my rules; but I am not ignorant of the fact that he who seeks public utility should have forgotten his own. Literary Man: I have said about my position all the ill I think of it; I have written only French Music, and I love only Italian; I have shown all the miseries of Society when I was happy by means of it; a bad *Copyist*, I here explain what good ones do. O truth! My interest was never anything before you; may it in no way sully the worship I have vowed to you.

\* \* \*

I stop so as not to extend the length of this article: I have said too much about it for every well-instructed *Copyist* who has a good hand and the taste for his trade; I would never say enough about it for the others. I will only add a word in conclusion. There are many intermediaries between what the Composer imagines and what the Listeners hear. It is for the *Copyist* to bring these two end points as close together as possible, to indicate clearly everything that should be done so that the performed Music renders to the Composer's ear exactly what he depicted in his head when composing it.

DISSONANCE [*Dissonance*], *n. fem.*<sup>26</sup> Every Sound that forms with another one a Chord disagreeable to the ear, or, better, every Interval that is not consonant. Now, as there are no Consonances other than those which form the Sounds of the Perfect Chord among themselves and with the fundamental, it follows that every other Interval is a genuine *Dissonance*. Even the Ancients counted as such Thirds and Sixths, which they omitted from the consonant Chords.

The term *Dissonance* comes from two words, the one Greek, the other

Latin, which mean *to sound doubly*. In fact, what makes the *Dissonance* disagreeable is that the sounds which form it, far from being joined with each other to the ear, reject each other, so to speak, and are heard by it as two distinct Sounds, even though struck at the same time.

The name *Dissonance* is sometimes given to the Interval and sometimes to each of the two Sounds which form it. But although two Sounds are dissonant to one another, the name *Dissonance* is given more specifically to that of the two which is foreign to the Chord.

There are an infinity of possible *Dissonances*; but as in Music all the Intervals that the received System does not furnish are excluded, they are reduced to a small number; further, for practice one should choose among these only those that suit the Genre and the Mode, and, finally, even exclude from these latter ones those which cannot be employed in accordance with the prescribed rules. What are these rules? Do they have any natural foundation, or are they purely arbitrary? This is what I propose to examine in this Article.

The physical principle of Harmony is derived from the production of the perfect Chord by the resonance of any Sound whatsoever; all the Consonances arise from it, and it is Nature itself that furnishes them. This therefore does not apply to the *Dissonance*, at least such as we practice it. We do indeed find, if you like, its generation in the progressions of consonant Intervals and in their differences, but we do not perceive the physical reason that authorizes us to introduce it into the very body of the Harmony. Father Mersenne contents himself with showing the generation by calculation and the various ratios of *Dissonances*, those that are rejected as well as those that are accepted, but he does not say anything about the right to employ them.<sup>27</sup> M. Rameau specifically says that the *Dissonance* is not natural to Harmony, and that it can be used only by the assistance of Art. Nonetheless, in another Work he tries to find its principle in the ratios of numbers and in harmonic and arithmetic proportions, as if there were any identity between the properties of abstract quantity and the sensations of hearing. But after having quite exhausted the analogies, after many metamorphoses of those various proportions, the ones in the others, after many operations and useless calculations, he ends by establishing, on weak conformities, the *Dissonance* he has given himself such trouble to find. Thus, because the arithmetic proportion in the order of the harmonic Sounds gives him, by the lengths of the Strings, a Minor Third in the bass (notice that he gives it to the treble by the calculation of the vibrations), he adds a new Minor Third to the bass of the Subdominant. The harmonic proportion gives him a Minor Third on the treble (he would give it to the bass by the vibrations), and he adds a new Minor Third to the treble of the

Dominant. These Thirds, added in this way, do not, it is true, form any proportion with the preceding ratios; the ratios they themselves should have are found to be altered. But this doesn't matter: M. Rameau turns everything to best account; the proportion serves him to introduce the *Dissonance*, and the lack of proportion to make it felt.<sup>28</sup>

Since the illustrious Geometer who dared to interpret M. Rameau's System for the Public has done away with all these vain calculations, I shall follow his example, or rather I shall transcribe what he says about *Dissonance*, and M. Rameau will owe me thanks for having taken this explanation from the *Elements of Music* rather than from his own writings.<sup>29</sup>

Assuming one knows the essential pitches of the Key according to M. Rameau's System—namely, in the Key of *do*, the Tonic *do*, the Dominant *sol*, and the Subdominant *fa*—one must also know that this same Key of *do* has two Pitches, *do* and *sol*, in common with the Key of *sol*, and the two pitches *do* and *fa* in common with the Key of *fa*. Consequently, this progression of the Bass *do sol* can belong to the Key of *do* or to the Key of *sol*, just as the progression of Bass *fa do* or *do fa* can belong to the Key of *do* or to the Key of *fa*. Therefore, when one passes from *do* to *fa* or to *sol* in a Fundamental Bass, one still does not know at that point what Key one is in. It would, however, be advantageous to know this and to be able, by some means, to distinguish the generator from its Fifths.

This advantage will be obtained by joining the Sounds *sol* and *fa* together in a single Harmony, that is, by joining to the Harmony *sol si re* of the Fifth *sol* the other Fifth *fa*, in this manner: *sol si re fa*, this additional *fa*, being the Seventh of *sol*, making a *Dissonance*. It is for this reason that the Chord *sol si re fa* is called a dissonant Chord or a Seventh Chord. It serves to distinguish the Fifth *sol* from the generator *do*, which always contains the Perfect Chord *do mi sol do*, given by Nature itself, without mixture and without alteration. (See CHORD [*Accord*], CONSONANCE\* [*Consonnance*], HARMONY\* [*Harmonie*].) It is seen by this that when one passes from *do* to *sol*, one passes at the same time from *do* to *fa*, because the *fa* is contained in the Chord of *sol*, and the Key of *do* is, by this means, completely determined because there is only this Key to which the Sounds *fa* and *sol* simultaneously belong.

Let us see now, continues M. d'Alembert, what we shall add to the Harmony *fa la do* of the Fifth *fa* below the generator in order to distinguish this Harmony from that of this same generator. It seems at first that one should add to it the other Fifth *sol* so that, passing to *fa*, the generator *do* passes at the same time to *sol*, and so that the Key would in this way be determined, but this introduction of *sol* into the Chord *fa la do*, would produce two Seconds in a row, *fa sol*, *sol la*, that is, two *Dissonances* whose

union would be too unpleasant to the ear: an inconvenience which must be avoided, for if we alter the Harmony of this Fifth *fa* in order to distinguish the Key, it must only be altered as little as possible.

This is why, instead of *sol*, we shall take its Fifth *re*, which is the Sound that comes closest to it, and we shall have for the Subdominant *fa* the Chord *fa la do re*, which is called a Great Sixth Chord or the Added Sixth [Chord].

One can note here the analogy observed between the Chord of the Dominant *sol* and that of the Subdominant *fa*.

The Dominant *sol*, by ascending above the generator, has a Chord composed entirely of Thirds in ascending from *sol*: *sol si re fa*. Now, the Subdominant *fa* being below the generator *do*, by descending from *do* toward *fa* by Thirds one will find *do la fa re*, which contains the same Sounds as the Chord *fa la do re* gives to the Subdominant *fa*.

It is further seen that the alteration of the Harmony of the two Fifths consists solely in the Minor Third *re fa* or *fa re*, added on each side to the Harmony of these two Fifths.

This explanation is all the more ingenious as it simultaneously shows the origin, the use, the progression of the *Dissonance*, its intimate relationship with the Key, and the means for reciprocally determining the one by the other. The defect that I find in it, but an essential defect which makes the whole collapse, is the use of a pitch foreign to the Key as an essential Pitch of the Key, and that by a false analogy which, serving as the base of M. Rameau's System, destroys it in disappearing.

I am speaking of that Fifth below the Tonic, of that subdominant between which and the Tonic one does not perceive the slightest connection that might justify the use of that Subdominant, not only as an essential pitch of the Key, but even in any quality whatsoever. What is there really in common between the resonance, the vibration of the Unisons of *do*, and the Sound of its Fifth below? It is not at all because the entire String is a *fa* that its aliquots resonate to the Sound of *do*, but because it is a multiple of the string *do*; and there no multiple of this same *do* that does not produce a similar phenomenon. Take the septuple: it will vibrate and resonate in its Parts just as the triple does. Is this to say that the Sound of this septuple or its Octaves would be essential pitches of the Key? Enough said, since it does not form even a commensurable ratio of Notes with the Tonic.

I know that M. Rameau has claimed that with the sounding of any string whatsoever another string at its twelfth below would vibrate without resonating; but aside from the fact that a sounding string which vibrates and does not resonate is a strange phenomenon in acoustics, it is now recognized that this pretended experiment is in error, that the lower



string vibrates because it is divided, and that it appears not to resonate because it renders in its parts only the unison of the higher, which is not easily distinguished.

Let M. Rameau then tell us that he takes the Fifth below because he finds the Fifth above, and that this play of Fifths appears to him convenient to establish his System: he will be congratulated for an ingenious invention; but let him not justify it by a chimerical experiment, let him not torment himself to discover the foundations of Harmony in the inversions of harmonic and arithmetic proportions, nor take the properties of numbers for those of Sounds.

Note further that if the counter-generation which he assumes could take place, the Chord of the Subdominant *fa* should not contain a Major Third, but a minor one, because the *la*-Flat is the genuine Harmonic which is assigned to it by this inversion  $1\ 1/3\ 1/5$ : *do fa la*. So that according to this account, the Scale of the minor Mode would naturally have the Minor Sixth, but it has a major one, as a fourth Fifth, or as Fifth of the second Note; here, then, is a further contradiction.

Finally, note that the fourth Note given by the series of aliquots, from which the true natural Diatonic arises, is not at all the Octave of the pretended Subdominant in the ratio of 4 to 3, but another fourth Note, entirely different, in the ratio of 11 to 8, so that every Theorist should perceive it at the first glance.

I now call upon the experience and on the ears of Musicians. Let them hear how harsh and savage the Imperfect Cadence from the Subdominant to the Tonic is in comparison to this same Cadence in its natural place, which is from the Tonic to the Dominant. In the first case, can one say that the ear no longer desires anything after the Chord of the Tonic? Does one not expect, despite the fact one has just had it, a continuation or a conclusion? Now, what is a Tonic after which the ear desires something? Can one regard it as a genuine Tonic, and is one not really then in the Key of *fa*, whereas one thought one was in that of *do*? Let it be observed how foreign to the Mode, and even hard for the Voice, the diatonic and successive Intonation of the fourth Note and of the Leading Tone, in ascending as well as descending, seems. If long habit accustoms the ear and the Voice of the Musician to it, the difficulty of Beginners in intoning this Note should show him quite clearly how little natural it is. This difficulty is attributed to three consecutive *Keys*. Shouldn't it be seen that these three consecutive *Keys*, just as the Note that introduces them, produces a barbarous Modulation that has no foundation in Nature? It assuredly guided the Greeks better when it made them stop their Tetrachord precisely at the *mi* of our Scale, that is, at the Note which precedes this fourth one; they preferred to

take this fourth one below and they thus discovered with their ear alone what all our harmonic theory has still not made us perceive.

If the testimony of the ear and that of reason unite, at least in the received System, to reject the pretended Subdominant not only from among the essential Pitches of the Key, but from among the Sounds which can enter into the Scale of the Mode, what becomes of all this theory of *Dissonances*? What becomes of the explanation of the minor Mode? What becomes of M. Rameau's whole System?

Perceiving the genuine generation of the *Dissonance* neither in Physics nor in calculation, therefore, I sought a purely mechanical origin for it, and it is in the following way that I tried to explain it in the *Encyclopedia*, without departing from M. Rameau's practical System.

I assume the necessity of the *Dissonance* to be recognized. (See HARMONY\* [*Harmonie*] and CADENCE [*Cadence*].) It is a matter of seeing where one should take this *dissonance* and how it must be employed.

If all the Sounds of the Diatonic Scale are successively compared with the fundamental Sound in each of the two Modes, one will find for every *Dissonance* only the Second and the Seventh, which is merely an inverted Second and which actually makes a Second with the Octave. That the Seventh is inverted from the Second, and not the Second from the Seventh, is evident from the expression of the ratios, for that of the Second, 8: 9, being simpler than that of the Seventh, 9: 16, the Interval it represents is not, consequently, the engendered one, but the generator. I well know that other altered Intervals can become dissonant; but if the Second is not found expressed or implied in it, these are only accidents of Modulation which Harmony does not take into consideration, and these *Dissonances* are then not at all treated as such. Thus, it is certain that where there is no Second there is no *Dissonance* either; and the Second is strictly speaking the only *Dissonance* that may be employed.

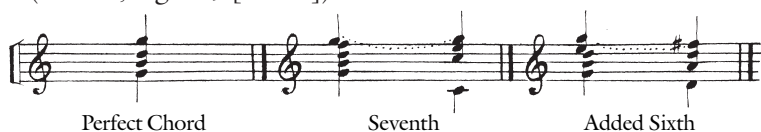
To reduce all the Consonances to their least extent, let us not leave the limits of the Octave, they are all contained in the Perfect Chord. Let us then take this Perfect Chord, *sol si re sol*, and see where in this Chord, which I do not yet suppose to be in any Key, we could place a *Dissonance*, that is a Second, in order to make it as little shocking to the ear as possible. On the *la* between the *sol* and the *si* it would make a Second with them both and, consequently, it would be doubly dissonant. It would be the same between the *si* and the *re*, as between every Interval of a Third; there remains the Interval of the Fourth between the *re* and the *sol*. Here a Sound could be introduced in two ways: 1st, one could add the Note *fa*, which would make a Second with the *sol* and a Third with the *re*; 2nd, or the Note *mi*, which will make a Second with the *re* and a Third with the *sol*. It is obvious

that the least harsh *Dissonance* one could find will be had in each of these two ways, for it will be dissonant with a single Sound, and it will engender a new Third, which, as with the two preceding ones, will contribute to sweetness of the total Chord. On the one hand we will have the Seventh Chord, and on the other the Added Sixth, the sole two dissonant Chords accepted in the System of the Fundamental Bass.

It is not enough to make the *Dissonance* heard; it must be resolved. You initially shock the ear only then to flatter it more agreeably. Here are two adjoining Sounds: on the one side the Fifth and the Sixth, on the other the Seventh and the Octave: as long as they thus produce the Second, they will remain dissonant; but let the Parts which make them heard move away from one another by a Degree, let the one ascend or the other descend diatonically, and your Second, on one side and the other, will become a Third, that is, one of the most pleasant Consonances. Thus after *sol fa* you will have *sol mi* or *fa la*; and after *re mi*, *mi do* or *re fa*: this is what is called resolving the *Dissonance*.

It remains to determine which of the two adjoining Sounds should ascend or descend, and which should remain in place: but the grounds for determining it leap to the eyes. Let the Fifth or the Octave remain as principal pitches, let the Sixth ascend and the Seventh descend, as accessory Sounds, as *Dissonances*. Furthermore, if, of the two adjoining Sounds, it is preferable for the one that has less distance to cover to do so, the *fa* will further descend on the *mi*, after the Seventh, and the *mi* of the Added Sixth Chord will ascend on the *fa*, for there is no other shorter route for resolving the *Dissonance*.

Let us now see what progression the fundamental Sound should make relative to the movement assigned to the *Dissonance*. Since one of the two adjoining Sounds remains in place, a connection should be made with the following Chord. The Interval that the Fundamental Bass should form in leaving the Chord should therefore be determined in accordance with these two conditions: 1st, so that the Octave of its preceding fundamental Sound may remain in place after the Seventh Chord, the Fifth after the Chord of the Added Sixth; 2nd, so that the Sound on which the *Dissonance* is resolved be one of the Harmonics of the one to which the Fundamental Bass passes. Now, the best movement of the Bass being by intervals of a Fifth, if it descends a Fifth in the first case, or ascends a Fifth in the second, all the conditions will be perfectly fulfilled, as is evident solely by inspection (Plate A, Figure 9 [below]).



From thence is derived a means of knowing which pitch of the Key each of these two Chords best suits. What are the two most essential pitches in each Key? They are the Tonic and the Dominant. How can the Bass progress when descending a Fifth on the two essential pitches of the Key? It is by passing from the Dominant to the Tonic; thus, the Dominant is the pitch which the Seventh Chord best suits. How can the Bass progress when ascending a Fifth on the two essential pitches of the Key? It is by passing from the Tonic to the Dominant; thus, the Tonic is the Pitch which the Added Sixth Chord best suits. This is why, in the example, I have given a Sharp to the *fa* of the Chord that follows it, for the *re* being Dominant-Tonic should contain the Major Third. The Bass can have other progressions, but these are the most perfect, and the two principal Cadences. (See CADENCE [*Cadence*].)

If these two *Dissonances* are compared with the fundamental Sound, one finds the one that descends is a minor Seventh, and the one that ascends a Major Sixth, from which is derived this new rule, that major *Dissonances* should ascend and minor ones descend; for, in general, a major Interval has less distance to cover in ascending, and a minor Interval in descending; and, also in general, in Diatonic progressions the smallest Intervals are preferable.

When the Seventh Chord contains a Major Third, this Third makes another *Dissonance* with the Seventh, which is the False Fifth, or, by inversion, the Tritone. This Third vis-à-vis the Seventh is also called a major *Dissonance*, and it is prescribed for it to ascend, but this is in its quality as Leading Tone, and without the Second this pretended *dissonance* would not exist at all or would not at all be treated as such.

One observation that must not be forgotten is that the only two Notes of the Scale that are not found in the Harmonics of the two principal pitches *do* and *sol* are precisely those that happen to be introduced by the *Dissonance* and complete, by this means, the Diatonic Scale, which, without this, would be incomplete. This explains how *fa* and *la*, although foreign to the Mode, are found in its Scale, and why their Intonation, always crude in spite of habit, makes the idea of the principal Key more remote.

It must also be noted that these two *Dissonances*, namely the Major Sixth and the minor Seventh, differ only by a Semitone, and would differ still less if the Intervals were quite exact. With the aid of this observation one can derive from the principle of the resonance a very closely related origin for both of them, as I am going to demonstrate.

The Harmonics that accompany any Sound whatsoever are not limited to those that make up the perfect Chord. There are an infinity of others, less appreciable to the extent that they become higher and their ratios more complex, and these ratios are expressed by the natural series of

aliquots,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$ ,  $\frac{1}{7}$ , etc. The first six terms of this series give the Sounds that make up the perfect Chord and its Replicas, the Seventh being excluded from it; nevertheless, this seventh term enters like them into the total resonance of the generator Sound, although less appreciably; but it does not enter as a Consonance; it therefore enters as a *Dissonance*, and this *Dissonance* is given by Nature. It remains to see its connection with those about which I have just been speaking.

Now, this ratio is intermediate between the one and the other, and very near to them both, for the ratio of the Major Sixth is  $\frac{3}{5}$ , and that of the minor Seventh  $\frac{9}{16}$ . Reduced to the same terms, these two ratios are  $\frac{48}{80}$  and  $\frac{45}{80}$ .

The ratio of the aliquot  $\frac{1}{7}$  reduced to simplicity by its Octaves is  $\frac{4}{7}$ , and, reducing this ratio to the same terms with the preceding ones, is found intermediary between the two in this manner,  $\frac{326}{560}$ ,  $\frac{320}{560}$ ,  $\frac{315}{560}$ , where it is seen that this mean ratio differs from the Major Sixth by only  $\frac{1}{35}$ , or by about two Commas, and from the minor Seventh by only  $\frac{1}{112}$ , which is much less than a Comma. In order to employ the same Sounds in the Diatonic genre and in various Modes, it has been necessary to alter them, but this alteration is not so great as to make us lose the trace of their origin.

I have shown, at the word CADENCE [*Cadence*], how the introduction of these two principal *Dissonances*, the Seventh and the Added Sixth, gives the means for connecting a succession of Harmony by making it ascend or descend at one's liking by the interlacing of *Dissonances*.

I do not speak here at all of the preparation of the *Dissonance*, less because it has too many exceptions to make a general rule of it than because here is not the place to do so. (See TO PREPARE\* [*Préparer*].) With regard to *Dissonances* by supposition or by suspension, see also these two words. Finally, I do not say anything about the Diminished Seventh either, a singular Chord of which I shall have occasion to speak at the word ENHARMONIC\* [*Enharmonique*].

Although this manner of conceiving *Dissonance* gives a clear enough idea of it, as this idea is not at all drawn from the basis of Harmony, but from certain conformities between its parts, I am quite far from making more of it than it merits, and I have never given it far more than what it deserves; but until now *Dissonance* has been so badly reasoned about that I do not believe I have done worse in this than the others. M. Tartini is the first, and until now the only one, who has deduced a Theory of *Dissonances* from the true principles of Harmony.<sup>30</sup> In order to avoid useless repetitions, I postpone it below to the word SYSTEM [*Système*], where I explain his. I shall abstain from judging whether or not he has found that of Na-

ture; but I should at least remark that this Author's principles would seem to have in their consequences that universality and that connection which is hardly found except in those which lead to the truth.

A further observation before finishing this Article. Every commensurable Interval is in reality consonant: only those whose ratios are irrational are truly dissonant, for it is only these to which no common fundamental Sound can be assigned. But past the point where the natural Harmonics are still appreciable, this consonance of commensurable Intervals is no longer accepted except by induction. Then these Intervals make up a great part of the Harmonic System, since they are in the ordering of its natural generation and are related to its common fundamental Sound; but they cannot be accepted as Consonances by the ear since it does not at all perceive them in the natural Harmony of the sounding body. Besides, the more complex the Interval is, the more it climbs to the high end of the fundamental Sound, which is proved by the reciprocal generation of the fundamental Sound and of the superior Intervals. (*See M. Tartini's System.*) Now, since when the distance from the fundamental Sound to the highest of the generating or engendered Interval exceeds the range of the Musical or appreciable System, everything that is beyond this range should be considered as nothing, such an Interval has no perceptible foundation at all and should be rejected from practice, or only accepted as Dissonant. This is not M. Rameau's System, nor M. Tartini's, nor mine, but the text of Nature, which, moreover, I do not undertake to explain.

EFFECT [*Effet*], *n. masc.* A pleasant and strong impression that produces excellent Music for the ear and the mind of the listeners; thus, the word *Effect* alone means in Music a great and fine *Effect*. And it will not only be said of a work that it has an *Effect*, but one will distinguish from this, under the name of *things of Effect*, all those in which the sensation produced appears superior to the means employed to arouse it.

A long practice can teach one to recognize things of *Effect* on paper; but it is only the Genius who can find them. It is the defect of bad Composers and of all Beginners to heap up Parts upon Parts, Instruments upon Instruments, in order to discover the *Effect* which flees them, and to open, as an Ancient said, a large mouth in order to blow into a small Flute. To see their Scores—so overloaded, so bristling, you would say that they are going to surprise you by prodigious *Effects*, and if you are surprised in hearing all that, it is to hear a smallish Music, scrawny, sickly, confused, without *Effect*, and more appropriate for deafening ears than for filling them. On the contrary, the eye seeks in the Scores of the great Masters those sublime and ravishing *Effects* that their Music produces when per-

## GENRES OF ANCIENT MUSIC

### NO. A ACCORDING TO ARISTOXENUS

The Tetrachord being supposed to be divided into 60 equal parts

DIATONIC	CHROMATIC	ENHARMONIC
Tender or soft $12 + 18 + 30 = 60$	Soft $8 + 8 + 44 = 60$	$6 + 6 + 48 = 60$
Syntonic or hard $12 + 24 + 24 = 60$	Hemiolian $9 + 9 + 42 = 60$	
	Tonic $2 + 12 + 36 = 60$	

### NO. B ACCORDING TO PTOLEMY

The Tetrachord being represented by the ratio of its two terms

DIATONIC	CHROMATIC	ENHARMONIC
Diatonic $\frac{256}{243} \times \frac{9}{8} \times \frac{9}{8} = \frac{4}{3}$	Soft $\frac{28}{27} \times \frac{15}{14} \times \frac{6}{5} = \frac{4}{3}$	$\frac{46}{45} \times \frac{24}{23} \times \frac{5}{4} = \frac{4}{3}$
	Tight or Syntonic $\frac{22}{21} \times \frac{12}{11} \times \frac{7}{6} = \frac{4}{3}$	

*Plate M, Figure 5*



formed. It is because those minute details are ignored or disdained by the true genius, because he does not at all amuse you by throngs of little and puerile objects, but he moves you by grand *Effects*, and because strength and simplicity always form their character when united.

ENHARMONIC [*Enharmonique*], *adj. taken subst.*<sup>31</sup> One of the three Genres of the Music of the Greeks, also very frequently called *Harmony* by Aristoxenus and his sectarians.<sup>32</sup>

This Genre resulted from a particular division of the Tetrachord according to which the Interval which is found between the Lichanos, or the third Pitch, and since the Mese, or the fourth, was one Ditonon, or Major Third, there remained only a Semitone to divide into two Intervals in order to complete the Tetrachord on the lower end, namely, from the Hypate to the Parhypate, and from the Parhypate to the Lichanos. We shall explain at the word GENRE [*Genre*] how this division was made.

The *Enharmonic* Genre was the sweetest of the three, according to Aristide Quintilianus' report.<sup>33</sup> It passed as very ancient, and the majority of Authors attributed its invention to Olympus, the Phrygian. But his Tetrachord, or rather his Diatessaron of this Genre, contained only three pitches, which among them formed two uncomposed Intervals: the first of a Semitone and the other of a Major Third; and from these two Intervals alone, repeated from Tetrachord to Tetrachord, the whole *Enharmonic* Genre then resulted. It was only after Olympus that they thought of inserting, in imitation of the other genres, a fourth Pitch between the first two in order to make the division of which I was just speaking. Their ratios will be found in accordance with the systems of Ptolemy and Aristoxenus (Plate M, Figure 5).

This Genre, so marvelous, so admired by the Ancients, and, according to some, the first of the three to be found, did not long retain its vigor. Its extreme difficulty soon caused it to be abandoned, in proportion as the Art gained combinations while losing its energy and as the delicacy of the ear was supplemented by the agility of the fingers. In addition, Plutarch sharply reprimanded the Musicians of his time for having lost the most beautiful of the three Genera, and for having dared to say that its Intervals are not appreciable—as if everything that escaped their coarse senses, this Philosopher adds, must be beyond nature.<sup>34</sup>

Today we have a type of *Enharmonic* Genre entirely different from that of the Greeks. It consists, like the other two, in one particular Harmonic progression, which engenders *Enharmonic* Intervals in the progression of the Parts by simultaneously or successively employing, between two Notes that are one Tone apart, the Flat from the superior and the Sharp from the

inferior. But although, according to the strictness of the ratios, this Sharp and this Flat should between them form an Interval (see SCALE [*Échelle*] and QUARTER-TONE [*Quart-de-ton*]), this Interval happens to be null by means of Temperament, which in the established System makes the same Sound serve two uses, which does not prevent such a transition from producing, by the force of the Modulation and of the Harmony, part of the effect that is sought in *Enharmonic* Transitions.

As this Genre is rather poorly known, and as our Authors have contented themselves with giving too succinct notions of it, I believe I should explain it here at a bit more length.

It is necessary to note first that the Diminished Seventh Chord is the only one on which truly *Enharmonic* transitions may be practiced, and that in virtue of that singular property it has of dividing the entire Octave into four equal intervals. Take from among the four Sounds which make up this Chord that which one wants as fundamental; one will always likewise find that the three other Sounds form a Diminished Seventh Chord on this sound. Now, the fundamental sound of the Diminished Seventh Chord is always a Leading Tone, so that, without changing anything in this Chord, one can, by means of double or of quadruple employment, make it serve successively on four different fundamentals, that is, on four different Leading Tones.

It follows from this that this same Chord, without changing anything either of the Accompaniment or of the Bass, can carry four different names, and consequently be figured in four different ways, namely: with a  $\flat$  under the name of the Diminished Seventh; with a  $\sharp$  under the name of the Major Sixth and False Fifth; with a  $\times$  under the name of the Minor Third and Tritone; and, finally, with a  $\times 2$  under the name of the Augmented Second. It being well understood that the Clef must be differently armed in accordance with the Keys in which one is assumed to be.

These, then, are four ways of leaving a Diminished Seventh Chord, by assuming oneself to be successively in four different [Keys]: for the fundamental and natural progression of the Sound which carries a Diminished Seventh Chord is for it to be resolved on the Tonic of the minor Mode, whose Leading Tone it is.

Let us now imagine the Diminished Seventh Chord on a *do*-Sharp Leading Tone. If I take the Third *mi* as fundamental, it will become Leading Tone in its turn, and will consequently introduce the minor Mode of *fa*; now, this *do*-Sharp still remains Leading Tone in the Chord of *mi*, but it is in its capacity as *re*-Flat, that is, of the sixth Note of the Key, and of the Diminished Seventh of the Leading Tone; thus, this *do*-Sharp,

which as Leading Tone was obliged to ascend in the Key of *re*, having become *re*-Flat in the Key of *fa*, is obliged to descend as a Diminished Seventh: this is an *Enharmonic* transition. If instead of the Third one takes, in the same Chord of *do*-Sharp, the Augmented Fifth *sol* as a new Leading Tone, the *do*-Sharp will then become *re*-Flat in its capacity as the fourth Note: another *Enharmonic* transition. Finally, if one takes as Leading Tone the Diminished Seventh itself, instead of *si*-Flat it must necessarily be considered as *la*-Sharp; which constitutes a third *Enharmonic* passage on the same Chord.

Thanks to these four different manners of successively considering the same Chord, one passes from one Key to another one that seems quite remote; one gives to the Parts progressions different from the one that they ought to have had in the first place, and these transitions, when properly handled, are capable not only of surprising but of delighting the Listener when they are well done.

Another source of variety in the same Genre is derived from the different ways in which one can resolve the Chord that introduces it; for although the most natural Modulation would be to pass from the Diminished Seventh Chord on the Leading Tone to that of the Tonic in the minor Mode, by substituting the Major Third for the minor one can make the Mode major, and even add to it the Seventh in order to change this Tonic into a Dominant, and to pass in this way into another Key. Thanks to these various combinations taken together, one can leave the Chord in twelve ways. But, of these twelve, there are only nine which, producing the conversion of the Sharp into a Flat or reciprocally, are genuinely *Enharmonic*, since the Leading Tone is not at all changed in the other three; furthermore, in these nine different Modulations there are only three different Leading Tones, each of which is resolved by three different transitions, so that, to grasp the thing correctly, there are on each Leading Tone only three true *Enharmonic* passages possible, all the others not being really *Enharmonic* or being related to one of the three first. (See Plate L, Figure 4, for an example of each of these transitions.)

In imitation of the Modulations of the Diatonic Genre, writing entire pieces in the *Enharmonic* Genre has several times been attempted, and, in order to give a sort of rule for the fundamental progressions of this Genre, it has been divided into *Diatonic-Enharmonic*, which proceeds by a series of major Semitones, and *Chromatic-Enharmonic*, which proceeds by a series of minor Semitones.

The Song of the first type is *Diatonic* because its Semitones are major; it is *Enharmonic* because two consecutive major Semitones form too large of a *Tone* of *Enharmonic* Interval. In order to form this type of Song, one



Plate L, Figure 4

must write a Bass that alternately descends a Fourth and ascends a Major Third. A part of the *Trio of the Furies* of the Opera *Hippolyte* is in this Genre, but it has never been possible to perform it at the Paris Opera, although M. Rameau assures that it has been so elsewhere by Musicians of good will, and that its effect was surprising.<sup>35</sup>

The Song of the second type is *Chromatic* because it proceeds by minor Semitones; it is *Enharmonic* because the two consecutive minor Semitones form too small of a *Tone* of *Enharmonic* Interval. In order to form this type of Song, one must write a Fundamental Bass that alternately descends a Minor Third and ascends a Major Third. M. Rameau informs us that he has composed an earthquake in the Opera *Indes galantes* in this Genre of Music, but that he was so badly served that he was obliged to change it into ordinary music.<sup>36</sup> (See M. d'Alembert's *Elements of Music*, pages 91, 92, 95, and 166.)<sup>37</sup>

Despite the examples cited and despite M. Rameau's authority, I believe I must warn young Artists that the *Enharmonic-Diatonic* and the *Enharmonic-Chromatic* both seem to me to be rejected as Genera, and I cannot believe that a Music modulated in this way, even with the most perfect execution, can ever be at all good. My reasons are that the brusque transitions from one idea to another, extremely remote idea are so frequent in it that it is not possible for the mind to follow these transitions with as much quickness as the Music presents them; that the ear does not have the time to perceive the very secret and very complex relationship of the Modulations, nor to infer the assumed Intervals; that one no longer finds in such successions a shadow of the Key or of the Mode; that it is equally impossi-

ble to retain that of the one being left or to foresee that of the one being entered; and that in the midst of all this one no longer knows at all where one is. The *Enharmonic* is merely an unexpected transition in which the astonishing impression is strongly formed and lasts a long time, a transition which consequently should not be repeated too brusquely or too often for fear lest the idea of the Modulation become confused and be entirely lost: for as soon as one hears only isolated Chords which no longer have a perceptible relation and common foundation, the Harmony no longer has enough unity or apparent coherence, and the effect that results from it is merely a vain noise without connection and without charm. If M. Rameau, less occupied with useless calculations, had better studied the Metaphysic of his Art, it is to be believed that the natural fire of this learned Artist would have produced prodigies whose seed was in his genius but which his prejudices have always stifled.

I do not even believe that simple *Enharmonic* Transitions can ever succeed well, either in Choruses or in Arias, because each of these pieces forms a whole in which unity should reign and whose Parts should have among themselves a more perceptible connection than this Genre can stamp them with.

What then is the true place of the *Enharmonic*? In my opinion, it is in the obligatory Recitative.<sup>38</sup> It is in a sublime and pathetic scene where the Voice should multiply and varying Musical inflections in imitation of the grammatical, oratorical, and often imperceptible accent; it is, I say, in such a scene that *Enharmonic* Transitions are well-placed, when one knows how to handle them for grand expressions and to firm them up, so to speak, by means of instrumental features which suspend speech and strengthen the expression. The Italians, who make admirable use of this Genre, employ it only in this manner. One can see in the first Recitative of Pergolesi's *Orfeo*<sup>39</sup> a striking and simple example of the effects that this great Musician knew how to draw from the *Enharmonic*, and how, far from making a modulation harsh, these transitions, having become natural and easy to sound, give an energetic sweetness to the whole declamation.

I have already said that our *Enharmonic* Genre is entirely different from that of the Ancients. I shall add that, although we do not have *Enharmonic* Intervals to sound, as they did, this does not prevent the modern *Enharmonic* from being more difficult to execute than theirs. Among the Greeks, *Enharmonic* Intervals, purely Melodious, demanded no change of ideas either in the Singer or in the listener, but only a great delicacy of the organ, whereas in our Music one must further add to that delicacy an exact knowledge of and refined feeling for the most brusque and least natural Harmonic metamorphoses: for if their phrasing is not heard, one cannot give

the words the Tone that suits them, or sing in tune in a Harmonic system, if one does not feel the Harmony.

EXPRESSION [*Expression*], *n. fem.* A quality by which the Musician keenly feels and energetically renders every idea he should render and every feeling he should express. There is an *Expression* in Composition and one in performance, and it is from their concurrence that the most powerful and most pleasant musical effect results.

In order to give *Expression* to his works, the Composer should grasp and compare all the relations that can be found among the features of his object and the productions of his Art; he should know or feel the effect of every character so as to convey precisely the one that he chooses in the degree that suits it: for, as a good Painter does not give the same light to all his objects, neither will the skillful Musician give the same energy to all his feelings, nor the same strength to all his portraits, and will place each Part in the place that suits it, less to make it alone shine than to give a greater effect to the whole.

After having seen clearly what he should say, he seeks how he will say it, and here begins the application of the precepts of the Art, which is like the particular language in which the Musician wishes to make himself understood.

Melody, Harmony, Movement, the Choice of Instruments and of Voices are the elements of Musical language, and Melody, by its immediate relationship with the grammatical and oratorical Accent, is the one that gives character to all the others. Thus, it is always the Song from which the principal *Expression* should be drawn, in Instrumental Music as much as in Vocal.

What one therefore seeks to render by the Melody is the Tone, in which the feelings one wants to represent are expressed, and one should be wary of imitating therein theatrical declamation, which is itself only an imitation, but rather seek to imitate the voice of Nature speaking without affectation and without artfulness. Thus, the Musician will first seek a Genre of Melody that furnishes him with the Musical inflections most suitable to the meaning of the words, while always subordinating the *Expression* of the words to that of the thought, and the latter even to the condition of the soul of the Interlocutor: for, when one is strongly affected, the whole discourse being held takes on, so to speak, the complexion of the general feeling that dominates in us, and one does not quarrel with the person one loves in the Tone in which one quarrels with someone indifferent.

Speech is differently accented according to the various passions that inspire it, now sharp and vehement, now calm and careless, now varied and

impetuous, now steady and tranquil in its inflections. From thence the Musician derives the differences in the Modes of Singing he uses and the various places where he maintains the Voice, making it proceed in the bass by small Intervals in order to express the languor of sadness and of despondency, drawing from it the sharp Sounds of rage and of pain in the treble and driving it rapidly, by all the Intervals of its Diapason, into the agitation of despair or the disorder of contrasting passions. It is above all necessary to observe that the charm of Music does not consist only in the imitation, but in a pleasant imitation, and that the declamation itself should be subordinated to the melody so as to produce such a great effect; so that the feeling cannot be portrayed without giving it that secret charm which is inseparable from it, nor touch the heart if one does not please the ear. And this is still quite conformable to nature, which gives to the tone of sensitive persons a certain indefinable touching and delightful inflections which people who feel nothing never have. Do not therefore go and take the baroque for what is expressive, nor harshness for energy; nor produce a hideous depiction of the passions you wish to render, nor act, in a word, as in the French Opera, where the passionate tone resembles cries of colic much more than the transports of love.

The physical pleasure which results from the Harmony in its turn increases the moral pleasure of the imitation by joining the pleasant sensations of Chords to the *Expression* of the Melody by means of the same principle about which I have just been speaking. But Harmony does still more: it strengthens the *Expression* itself by giving more exactness and precision to the melodious Intervals; it animates their character, and, exactly marking their place in the order of the modulation, it recalls what precedes, announces what must follow, and thus links the phrases in the Song as ideas are linked in discourse. Harmony, envisioned in this way, furnishes the Composer with great means of *Expression* which elude him when he seeks the *Expression* only in Harmony alone; for then, instead of animating the Accent, he stifles it by his Chords, and all the Intervals, muddled in a continual filling out, offer the ear only a series of fundamental Sounds that have nothing touching or pleasant about them and whose effect stops at the brain.

What will the Harmonist do, therefore, to work towards the *Expression* of the Melody and to give it more effect? He will carefully avoid covering the principal Sound under the combination of Chords; he will subordinate all his Accompaniments to the melodic Part; he will sharpen its energy with the assistance of other Parts; he will strengthen the effect of certain passages by perceptible Chords; he will shield others by supposition or by suspension by counting them as nothing on the Bass; he will



make strong *Expression* come from major Dissonances; he will reserve minor ones for gentler feelings. Sometimes he will link together all the Parts by continuous and flowing Sounds; sometimes he will make them contrast in the Song by staccato Notes. Sometimes he will strike the ear with full Chords; sometimes he will strengthen the Accent by the choice of a single Interval. Everywhere he will make the linking of the Modulations present and perceptible and will make the Bass and its Harmony serve to determine the place of each passage in the Mode so that one never hears one Interval or one feature of the Song without sensing at the same time its relation with the whole.

With regard to Rhythm, in days gone by so powerful for giving strength, variety, and pleasure to Poetic Harmony, if our Languages, less accented and less prosodic, have lost the charm that resulted from it, our Music has substituted for it another, more independent of the discourse in the evenness of its Meter, and in the various combinations of its beats, whether at the same time in the whole or separately in each Part. The quantities of the Language are almost lost under those of the Notes, and the Music, instead of speaking with the speech, borrows, after a fashion, a language apart from the Meter. The strength of the *Expression* consists, in this part, in bringing together these two languages as much as is possible and in making it so that, if the Meter and the Rhythm do not speak the same way, they at least say the same things.

The gaiety that gives liveliness to all our movements should likewise give it to the Meter; sadness confines the heart, slows the movements; and the same languor is felt in the Songs it inspires. But when suffering is lively or if great combats take place in the soul, speech is uneven: it proceeds alternately with the slowness of the Spondee and with the speed of the Pyrrhic, and often ceases all of a sudden as in the obligatory Recitative. It is for this reason that the most expressive Music, or at least the most passionate, is commonly the one wherein the Beats, although equal among themselves, are the most unevenly divided, whereas the image of sleep, of rest, and of the peace of the soul are readily portrayed with equal Notes, which do not go in such a lively way or so slowly.

An observation which the Composer should not neglect is that the more studied the Harmony is, the less lively the movement should be, so that the mind has time to seize the progression of the Dissonances and the rapid linking of the Modulations. It is only the utmost fury of the passions that allows the speed of the Meter and the harshness of the Chords to be allied. Then, when he has lost his head and, due to his agitation, the Actor seems no longer to know what he is saying, this energetic and terrible disorder can be conveyed all the way to the soul of the Spectator and likewise

put him outside of himself. But if you are not fiery and sublime you will be only baroque and cold; throw your Listeners into delirium, or guard against falling into it yourself, for he who loses his reason is always merely insane in the eyes of those who preserve it, and madmen are no longer interesting.

Although the greatest strength of *Expression* is drawn from the combination of Sounds, the quality of their timbre is not indifferent for the same effect. There are strong and sonorous Voices that make an impression by their mettle; others light and flexible, good for difficult performances; others sensitive and delicate that go to the heart by soft and pathetic Songs. In general, Sopranos and all high voices are more appropriate for expressing tenderness and sweetness, Basses and Baritones for rage and anger. But the Italians have banished Basses from their Tragedies as a Part whose Singing is too coarse for the heroic genre, and have substituted for it the Taille, or Tenor, whose Singing has the same character with a more pleasant effect. They employ these same Basses more suitably in Comedy for harlequins and generally for all supporting characters.

Instruments also have very different *Expressions* according to whether their Sound is strong or weak, whether their timbre is sharp or sweet, whether the Diapason is low or high, and whether Sounds can be drawn from them in greater or smaller numbers. The Flute is tender, the Oboe gay, the Trumpet warlike, the Horn sonorous, majestic, appropriate for grand *Expressions*. But there is no Instrument from which a more varied and more universal *Expression* can be drawn than from the Violin. This admirable Instrument serves as the basis for all Orchestras and suffices for the great Composer to draw out all the effects that bad Musicians uselessly seek in a hotchpotch of a multitude of different Instruments. The Composer should know the handling of the Violin to Finger his Tunes, to arrange his Arpeggios, to know the effect of open Strings, and to employ and choose his Keys according to the various characters they have on this Instrument.

In vain does the Composer know how to animate his Work if the warmth that should reign in it does not pass to those who perform it. The Singer who sees only Notes in his part is not at all in a position to grasp the Composer's *Expression*, nor give one to what he sings if he has not well grasped its meaning. He must understand what he reads in order to make it understood by others, and it is not enough to be sensitive in general if one is not so in particular to the energy of the Language that one is speaking. Begin therefore by clearly understanding the character of the Song you have to render, its relationship to the meaning of the words, the distinction of its phrases, the Accent it has of itself, what it supposes in the voice of the Per-

former, the energy the Composer has given to the Poet, and that which you can give in your turn to the Composer. Then you will abandon your organs to all the warmth these considerations will have inspired in you; do what you would do if you were at once the Poet, the Composer, the Actor, and the Singer, and you will have all the *Expression* that is possible for you to give to the Work you must render. In this way, it naturally happens that you will put delicacy and ornamentation in Songs that are merely elegant and graceful, piquancy and fire in those that are animated and gay, groaning and moaning in those that are tender and pathetic, and all the agitation of the *Forte-piano* in the rage of the violent passions. Wherever the musical Accent is brought together strongly with the oratorical Accent, wherever the Meter is vividly felt and serves as a guide for the Accents of the Song, wherever the Accompaniment and the Voice know how to accord and unite their effects in such a way that only one Melody results and that the deceived Listener attributes to the Voice the passages with which the Orchestra embellishes it, finally, wherever ornamentation, properly handled, bears witness to the ability of the Singer without covering and disfiguring the Song, the *Expression* will be sweet, pleasant, and strong, the ear will be charmed and the heart moved, the physical and the moral will work simultaneously toward the listeners' pleasure, and there will reign such an Accord between the speech and the Song that the whole will appear to be nothing but a delightful language that knows how to say everything and always pleases.

FUGUE [*Fugue*], *n. fem.* A piece or passage of Music in which one treats, according to certain rules of Harmony and of Modulation, a Song called the *subject* by making it pass successively and alternately from one Part to another.

Here are the principal rules for the *Fugue*, some of which belong to it and others it has in common with Imitation.

I. The subject proceeds from the Tonic to the Dominant, or from the Dominant to the Tonic, by ascending or descending.

II. Every *Fugue* has its response in the part that immediately follows the one that has begun.

III. This response should produce the subject on the Fourth or the Fifth, and by a like movement, as exactly as possible; proceeding from the Dominant to the Tonic when the subject is announced from the Tonic to the Dominant, and *vice versa*. A Part can also reprise the same subject on the Octave or on the Unison of the preceding, but then it is a repetition rather than a genuine response.

IV. As the Octave is divided into two unequal parts, of which the first contains four Degrees in ascending from the Tonic to the Dominant, and the other only three in continuing to ascend from the Dominant to the Tonic, one is obliged to consider this difference in the expression of the subject, and to make some change in the response in order not to leave the essential Pitches of the Mode. It is another thing when changing the key is proposed; then, the very precision of the response, taken on another Pitch, produces the alterations appropriate for this change.

V. The *Fugue* must be designed in such a way so that the response can enter before the end of the first Song, so that one simultaneously hears them both in part, so that by this anticipation the subject is connected, so to speak, to itself, and so that the art of the Composer is shown in this concurrence. It is foolery to present as a *Fugue* a Song that is made only to stroll from one Part to another without any other difficulty than then accompanying it as one likes. This merits at the very most the name *Imitation*. (See IMITATION [*Imitation*].)

Besides these rules, which are fundamental, in order to succeed in this genre of Composition there are others which, though being only stylistic, are no less essential. In general, *Fugues* produce a Music that is more noisy than pleasant; this is why they are more suitable in Choruses than anywhere else. Now, as their principal merit is always to fix the ear on the principal Song or subject, which is then made to pass constantly from Part to Part, and from Modulation to Modulation, the Composer should take every care always to make this Song quite distinct, or to prevent it from being stifled by or confounded among the other parts. There are two means for this. The first is in the movement, which must be constantly contrasted; so that, if the progression of the *Fugue* is precipitous the other Parts proceed deliberately by long Notes; and, on the contrary, if the *Fugue* progresses gravely, let the Accompaniments labor even more. The second means is to separate the Harmony for fear lest the other Parts, approaching too closely to the one that Sings the subject, become confounded with it and prevent it from being heard clearly enough, in such a way that what would be a vice everywhere else becomes a beauty here.

*Unity of Melody*: this is the great common rule that must often be practiced by different means. The Chords, the Intervals, must be chosen so that a certain Sound, and not another, produces the principal effect: *unity of Melody*. Sometimes it is necessary to bring Instruments or Voices of a different type into play so that the Part that should dominate is more easily distinguished: *unity of Melody*. Another no less necessary matter for attention in the various linkings of Modulations which direct the progres-

sion and course of the *Fugue* is to make all these Modulations correspond at the same time in all the Parts, to link the whole in its course by an exact conformity of Key, for fear lest, one Part being in one Key and another in another, the entire Harmony will not be in any, and will no longer present a simple effect to the ear, nor a simple idea to the mind: *unity of Melody*. In a word, in every *Fugue*, the confusion of the Melody or of the Modulation is what is at the same time most to be feared and most difficult to avoid; and since the pleasure this genre of Music produces is always mediocre, it can be said that a beautiful *Fugue* is the thankless masterpiece of a good Harmonist.

There are yet several other styles of *Fugues*, as *perpetual Fugues*, called *Canons*, *double Fugues*, *Counterfugues*, or *inverted Fugues*, that can each be seen at its word, and which serve more to extend the art of Composers than to flatter the ears of Listeners.

*Fugue*, from the Latin *Fuga*, *flight*, because the Parts, setting out in the same way successively, seem to flee and pursue one another.

GENIUS [*Génie*], *n. masc.*<sup>40</sup> Seek not, young Artist, what is *Genius*. If you have any, you feel it in yourself. If you do not, you will never know it. The *Genius* of the Musician submits the entire Universe to his Art. He paints every portrait by Sounds; he makes silence itself speak; he renders ideas by feelings, feelings by accents; and the passions he expresses, he arouses them in the bottom of hearts. Through him, sensual delight takes on new charms; the grief he causes to moan wrests cries; he burns constantly and is never consumed. He expresses wintry weather and ice with warmth; even when painting the horrors of death he carries into the soul that feeling of life which does not abandon it, and which he communicates to hearts made to feel it. But, alas! He does not know how to say anything to those in whom its seed is not present, and his wonders are little felt by anyone who cannot imitate them. Do you then want to learn whether this spark of devouring fire animates you? Run, fly to Naples to listen to the masterpieces of *Leo*, of *Durante*, of *Jomelli*, of *Pergolesi*.<sup>41</sup> If your eyes fill with tears, if you feel your heart beating, if you are seized with trembling, if you are suffocated by oppression amidst your transports, take *Metastasio*<sup>42</sup> and set to work: his *Genius* will warm yours, you will create after his example. This is what *Genius* does, and other eyes will soon render you the tears the Masters have made you shed. But if the charms of this great Art leave you calm, if you are neither delirious nor enraptured, if you feel what enraptures you is merely beautiful, dare you ask what is *Genius*? Vulgar man: do not profane that sublime word. What would it matter to you to know it? You would not know how to feel it: compose French Music.

TASTE [*Gout*], *n. masc.* Of all natural gifts, *Taste* is that which is best felt and least explicable; it would not be what it is if it could be defined: for it judges objects on which judgment no longer has any hold, and serves, if I dare speak this way, as the spectacles of reason.

In Melody, there are some Songs more pleasant than others, although equally well Modulated; in harmony, there are things with effect and things without effect, all of them equally regular; there is in the intermixing of parts an exquisite art that makes some shine by means of the others that depends on something finer than the law of contrasts. There are likewise in the performance of a small piece different manners of rendering it, without ever departing from its character; of these manners, some please more than others, and far from being able to submit them to rules, one can not even determine them. Reader, account for these differences, and I will tell you what *Taste* is.

Each man has a particular *Taste* by which he gives to the things he calls beautiful and good an ordering that belongs only to him. One is most touched by pathetic pieces, another prefers gay Tunes. A soft and flexible Voice loads its Songs with pleasant ornaments, a clear and strong Voice loves its own passionate accents. One will look for simplicity in the Melody; the other will attach great importance to mannered features; and they both will call what they prefer elegant *Taste*. This difference sometimes comes from the different dispositions of the organs, which *Taste* teaches one how to take advantage of; sometimes from the particular character of each man, which disposes him to be more sensitive to one pleasure or one fault rather than another; sometimes from the diversity of age or of sex, which turns the desires toward different objects. In all these cases, each having only his *Taste* to oppose to that of another, it is obvious that it must not be disputed about at all.

But there is also a general *Taste* upon which all well-constituted people are in agreement; and it is to this one alone to which one can give the name of *Taste* absolutely. Have a Concert heard by ears sufficiently trained and men sufficiently instructed: the greater number will ordinarily agree concerning the judgment of the pieces and concerning the ordering of preference that belongs to them. Ask each the reason for his judgment, there are things concerning which they will render an almost universal opinion: these things are those which are found submitted to rules; and this common judgment is then that of the Artist or of the Connoisseur. But of those things which they agree to find good or bad, there are some concerning which they will not be able to justify their judgment by any solid reason common to all; and this last judgment belongs to the man of *Taste*. If perfect unanimity is not found in this, it is because all are not

equally well constituted, because all are not people of *Taste*, and because the prejudices of habit or of education often change the order of natural beauties by arbitrary conventions. As for that *Taste*, it can be disputed, since there is not one of them that is true; but I scarcely see any other means of ending the discussion than that of counting voices, when one does not even agree with that of Nature. This, then, is what should decide the preference between French and Italian Music.

Furthermore, Genius creates, but *Taste* chooses; and oftentimes a too abundant Genius needs a severe Censor who prevents it from abusing its riches. Without *Taste* one can make great things; but it is it that makes them interesting. It is *Taste* that makes the Composer grasp the ideas of the Poet; it is *Taste* that furnishes them both with everything that can ornament and makes their subject shine; and it is *Taste* that gives to the Listener the feeling for all its affinities. Nevertheless, Taste is not at all sensitivity. One can have a great deal of *Taste* with a cold soul, and such a man transported by truly passionate things is little touched by graceful ones. It sees that *Taste* fastens more willingly upon small expressions, and sensitivity on grand ones.

HARMONY [*Harmonie*], *n. fem.* The meaning the Greeks gave to this word in their Music is all the less easy to determine as, originally being a proper noun, it does not have any roots by which one may break it up in order to derive its etymology. In the ancient treatises that remain to us, *Harmony* seems to be the Part that has for its object the suitable succession of Sounds insofar as they are high or low, as opposed to the two other Parts called *Rhythmica* and *Metrica*, which relate to the Time and to the Meter, which leaves a vague and indeterminate idea for this suitability which can be fixed only by an express study of all the rules of the Art. And still, after this, *Harmony* will be very difficult to distinguish from Melody, at least unless one adds to this latter one the ideas of Rhythm and Meter, without which, in fact, no Melody can have a determinate character, whereas *Harmony* has its own by itself, independently of every other quantity. (See MELODY\* [*Mélodie*].)

It is seen, by a passage from Nicomachus,<sup>43</sup> and by others, that they also sometimes gave the name *Harmony* to the Consonance of the Octave and to the Concerts of Voices and Instruments that were performed at the Octave, and which were more commonly called *Antiphons*.

HARMONY, according to the Moderns, is a succession of Chords according to the laws of Modulation. For a long time this *Harmony* had no other principles than rules that were almost arbitrary or founded uniquely on the approbation of a trained ear which judged the good or bad succes-



sion of Consonances and whose decisions were afterward calculated. But since Father Mersenne and M. Sauveur found that every Sound, although simple in appearance, was always accompanied by other, less appreciable Sounds which along with it formed the Perfect Major Chord, M. Rameau began from this experiment and made it the basis of his Harmonic system, with which he has filled many books, and which M. d'Alembert has finally taken the trouble to explain to the Public.<sup>44</sup>

M. Tartini, beginning from another experiment—newer, more delicate, and no less certain, has reached rather similar conclusions by a completely contrary path.<sup>45</sup> M. Rameau has the Upper partials generated by the Bass, M. Tartini the Bass by the Upper partials; the latter derives *Harmony* from Melody, and the former does entirely the opposite. In order to decide from which of these two Schools the best works must come, it is necessary only to know which should be made for the other: the Song or the Accompaniment. A short explanation of M. Tartini's will be found at the word SYSTEM [*Système*]. I continue to speak here of M. Rameau's, which I have followed in this whole work, as being the sole one accepted in the country in which I am writing.

I should nevertheless declare that this System, ingenious as it may be, is anything but founded on Nature, as he repeats incessantly; that it is established merely on analogies and conformities that an inventive man could overturn tomorrow by others more natural; that, finally, of the experiments from which he deduces it, one is acknowledged as false and the other does not at all supply the conclusions he draws from it. In fact, when this Author wanted to decorate the reasonings on which he established his theory with the title of a *Demonstration*, everyone ridiculed him; the Academy loudly disapproved of this obstreperous qualification; and M. Estève, of the Royal Society of Montpellier, made him see that, to begin with this proposition, that in the law of Nature the Octaves of the Sounds represent them and can be taken for them, there was nothing at all about it that was demonstrated nor even solidly established in his pretended Demonstration.<sup>46</sup> I return to his System.

The physical principle of the resonance offers us isolated and solitary Chords; it does not establish their succession. A regular succession is nevertheless necessary. A Dictionary of selected words is not a harangue, nor a collection of good Chords a Piece of Music: a sense is needed, connection is needed in Music as well as in language; something of what precedes must be transmitted to what follows so that the whole may make up an ensemble and be capable of genuinely being called a unity.

Now, the complex sensation which results from a Perfect Chord is resolved into the absolute sensation of each of the Sounds that make it

up, and in the comparative sensation of each of the Intervals these same Sounds form among themselves. There is nothing perceptible in this Chord beyond this, from which it follows that it is only by the relation of Sounds and by the analogy of Intervals that the connection in question can be established; that is the true and unique principle from which all the laws of *Harmony* and of Modulation flow. If, therefore, the entire *Harmony* was formed solely by a succession of Perfect Major Chords, it would suffice to proceed in it by Intervals similar to those that make up such a Chord, for since some Sound of the preceding Chord is then necessarily prolonged in the following one, all the Chords would be sufficiently connected and the *Harmony* would be a unity, at least in this sense.

But, aside from the fact that such successions would exclude all Melody by excluding the Diatonic Genre, which forms its basis, they would not be directed toward the true goal of the Art, since Music, being a discourse, should like it have its periods, its phrases, its suspensions, its pauses, its punctuation of every type, and since the uniformity of Harmonic progressions would offer nothing of all this. Diatonic progressions required that major and minor Chords be intermixed, and the need for Dissonances to mark the phrases and pauses was felt. Now, the linked succession of Perfect Major Chords produces neither the Perfect Minor Chord nor the Dissonance, nor any type of phrasing, and punctuation is found to be totally lacking in it.

M. Rameau, wanting positively to derive all our *Harmony* from Nature in his System, has had recourse, for this result, to another experiment of his invention of which I have spoken above and which is the inversion of the first. He claimed that any Sound whatsoever furnished in its multiples a Perfect Minor Chord in the bass, of which it was the Dominant or the Fifth, just as it furnished a major in its aliquots, of which it was the Tonic or the Fundamental. He has put forward as an assured fact that one sounding String causes two other, lower Strings to vibrate in their totality without, nevertheless, causing them to resonate, one on its major Twelfth and the other on its Seventeenth; and from this fact, joined to the preceding, he has quite ingeniously deduced not only the introduction of the minor Mode and of the dissonance into *Harmony*, but the rules of harmonic phrasing and of all Modulation, such as they are found at the words CHORD [*Accord*], ACCOMPANIMENT [*Accompagnement*], FUNDAMENTAL BASS [*Bass-Fondamentale*], CADENCE [*Cadence*], DISSONANCE\* [*Dissonnance*], MODULATION\* [*Modulation*].

But first of all, the experiment is false. It is acknowledged that the Strings tuned below the fundamental Sound do not at all vibrate in their entirety to this fundamental Sound, but that they are divided in order to

render only its unison, which, consequently, has no Harmonics below. It is furthermore acknowledged that the property that the Strings have of being divided is not at all peculiar to those which are tuned to the Twelfth and the Seventeenth below the fundamental Sound, but that it is common to all its multiples. From which it follows that since the Intervals of the Twelfth and the Seventeenth below are not unique in their way, nothing can be concluded in favor of the Perfect Minor Chord they represent.

Even were the truth of this experiment assumed, this would not come close to overcoming the difficulties. If, as M. Rameau claims, all *Harmony* is derived from the resonance of the sounding body, then it does not at all derive from it the vibrations of the sounding body, which does not resonate alone. In actuality, it is a strange theory to derive the principles of *Harmony* from something that does not resonate; and it is strange physics to make the sounding body vibrate and not resonate, as if Sound itself were anything other than air agitated by these vibrations. Besides, the sounding body does not only produce, aside from the principal Sound, the Sounds that along with it make up the Perfect Chord, but an infinity of other Sounds, formed by all the aliquots of the sounding body, which do not at all enter into that Perfect Chord. Why are the first consonant, and why are the others not, since they are all equally given by Nature?

Every Sound produces a truly Perfect Chord since it is formed from all its Harmonics and since it is by them that it is a Sound. Nevertheless, these Harmonics are not heard, and only a simple Sound is distinguished, unless it is extremely loud; from which it follows that the only good *Harmony* is Unison, and that as soon as Consonances are distinguished, the *Harmony* has lost its purity since the natural proportions are altered.

This alteration is then made in two ways. First, by having certain Harmonics sounded, and not others, one changes the relation of force that should reign between them all in order to produce the sensation of a unique Sound, and the unity of Nature is destroyed. By doubling these Harmonics, one produces an effect similar to that which would be produced by stifling all the others; for then it must not be doubted that one might hear, along with its generator Sound, those of the Harmonics that would have been left, whereas by leaving them all, they destroy one another and concur together to produce and to strengthen the unique sensation of the principal Sound. This is the same effect which the full playing of the Organ produces when, successively removing the Registers, one leaves the *Doublette* and the *Quinte* with the Principal, for then that Fifth and that Third, which remain confused, are separately and disagreeably distinguished.

Furthermore, the Harmonics that are made to be sounded themselves

have other Harmonics which do not come from the fundamental Sound. It is through these added Harmonics that the one which produces them is still more harshly distinguished; and these same Harmonics which make the Chord thus felt do not at all enter into its *Harmony*. This is why the most perfect Consonances naturally displease ears little disposed to hear them; and I do not doubt that the Octave itself would be displeasing, like the others, if the mixture of the voices of men and of women did not habituate one to it from infancy.

It is still worse with the Dissonance, since not only the Harmonics of the Sound that produce it but this Sound itself does not at all enter into the harmonious system of the fundamental Sound, which makes it so that the Dissonance is always distinguished in a shocking way amongst all the other Sounds.

Every Organ key, in *plein jeu*, produces a Perfect Major Third Chord which is not distinguished from the fundamental Sound, unless extreme attention is paid and unless one draws out the playing successively; but these Harmonic Sounds are confounded with the principal one only due to the great noise and to an arrangement of registers by which the pipes that cause the fundamental Sound to resonate cover those that produce its Harmonics by their power. Now, this continual proportion is not observed and cannot be observed in a Concert since, given the inversion of the *Harmony*, it would be necessary for this greater power to pass at every instant from one Part to the another, which is not practicable and would disfigure the whole Melody.

When the organ is played, every key in the Bass causes a Perfect Major Chord to be sounded; but because this Bass is not always fundamental, and because one often modulates by a Perfect Minor Chord, this Perfect Major Chord is rarely the one which the right hand strikes; so that the Minor Third is heard with the major one, the Fifth with the Tritone, the Augmented Seventh with the Octave, and a thousand other cacophonies by which our ears are little shocked, since habit renders them accommodating; but it is not at all to be presumed that this would be so for a naturally just ear, and which, for the first time, would put this *Harmony* to the test.

M. Rameau claims that the Upper partials by some simple means naturally suggest their Bass, and that a man having a just and untrained ear will naturally intone that Bass. This is a prejudice of a Musician refuted by all experience. Not only will someone who has never heard either Bass or *Harmony* not discover either this *Harmony* or this Bass by himself, but they will displease him if he is made to hear them, and he will much prefer simple Unison.

When one considers that of all the peoples of the earth, who all have a

Music and a Singing, the Europeans are the only ones who have a *Harmony*, Chords, and who find this mixture pleasant; when one considers that the world lasted so many centuries without any of all the nations that have cultivated the Fine Arts having known about this *Harmony*; that no animal, no bird, no being in Nature produces any Chord other than Unison, nor any Music other than Melody; that the Oriental languages, so sonorous, so Musical, that Greek ears, so delicate, so sensitive, trained with such Art, never guided these voluptuous and passionate people toward our *Harmony*; that without it their Music had such prodigious effects; that with it ours has such weak ones; that, finally, it was reserved to the Peoples of the North—whose harsh and coarse organs are more touched by the shouting and noise of Voices than by the sweetness of accents and the Melody of inflections—to make this great discovery and to give it as the basis for all the rules of the Art; when, I say, one pays attention to all this, it is quite difficult not to suspect that all our *Harmony* is but a Gothic and barbarous invention which we never would have conceived of if we had been more sensitive to the genuine beauties of the Art and to truly natural Music.<sup>47</sup>

M. Rameau nonetheless claims that *Harmony* is the source of Music's greatest beauties; but this sentiment is contradicted by facts and by reason. By the facts: because all of Music's great effects have ceased and since it has lost its energy and its strength ever since the invention of Counterpoint—to which I add that purely harmonic beauties are learned beauties which transport only people versed in the Art, whereas Music's true beauties, being from Nature, are and should be equally perceptible to all men, learned and ignorant.

By reason, since *Harmony* does not furnish any principle of imitation by which Music, forming images or expressing feelings, may be elevated to the Dramatic or imitative genre, which is the most noble part of the Art, and the only energetic one, all that regards merely the physics of Sounds being quite limited in the pleasure they give us and having but very little power over the human heart. (See MELODY\* [*Mélodie*].)

IMITATION [*Imitation*], *n. fem.* Dramatic or theatrical Music work together toward *Imitation* just like Poetry and Painting: it is this common principle to which all the Fine Arts are related, as M. le Batteux has shown.<sup>48</sup> But this *Imitation* does not have the same scope for all of them. Everything the imagination can represent falls within the competence of Poetry. Painting, which does not offer its portraits to the imagination, but to the sense and to a single sense, depicts only objects subject to sight. Music would seem to have the same limits with respect to hearing; nevertheless, it por-

trays everything, even objects which are only visible: by an almost inconceivable magic trick it seems to put the eye in the ear, and the greatest marvel of an Art that acts only by motion is to be able to form even the image of rest. Night, sleep, solitude, and silence are counted among Music's great portraits. It is known that noise can produce the effect of silence and silence the effect of noise, as when one falls asleep at an unvarying and monotonous reading and wakes up the instant it ceases. But Music acts more intimately on us by arousing by one sense affections similar to those that can be aroused by another, and, as the relationship can be perceptible only when the impression is strong, Painting, lacking this power, can give to Music only the *Imitations* that the latter draws from it. Let all of nature be asleep, he who contemplates it sleeps not, and the Musician's Art consists in substituting for the imperceptible image of the object that of the movements its presence arouses in the heart of the Contemplator. Not only will it agitate the sea, animate the flame of a blaze, make rivers flow, rain fall, and torrents swell, but it will paint the horror of a frightful desert, darken the walls of a subterranean prison, calm the tempest, make the air tranquil and serene, and spread from the orchestra a new freshness over the groves. It will not represent these things directly, but will arouse the same movements in the soul that are experienced in seeing them.<sup>49</sup>

I have said at the word HARMONY\* [*Harmonie*] that no principle is derived from it that leads to musical *Imitation* since there is no relationship between Chords and the objects one would like to portray or the passions one would like to express. I will show at the word MELODY\* [*Mélodie*] what this principle is that Harmony does not furnish and what features given by Nature are used by Music in order to represent these objects and these passions.

INTERVAL [*Intervalle*], *n. masc.* The Difference from one Sound to another from low to high; it is the entire space that one of the two [sounds] would have to cover before arriving at the Unison of the other. The difference between *Interval* and *Range* is that the *Interval* is considered as undivided and the *Range* as divided. In the *Interval*, only the two limits are considered; in the *Range*, intermediary ones are assumed between them. The *Range* forms a system, but an *Interval* can be detached.

Taking this word in its most general sense, it is obvious that there are an infinity of *Intervals*; but as the number of Sounds is limited in Music to those that make up a certain system, the number of *Intervals* is thereby also limited to those which these Sounds can form among themselves. So that by combining all the Sounds of any system whatsoever two by two,



one will have all the possible *Intervals* in this same system; concerning which it will remain to reduce all those which are found to be equal to the same type.

The Ancients divided the *Intervals* of their Music into simple or uncompounded *Intervals*, which they called *Diastemas*, and into compounded *Intervals*, which they called *Systemas* (See these words.) *Intervals*, says Aristoxenus,<sup>50</sup> differ from one another in five ways. 1st. In extent; a large *Interval* differs in this way from a smaller one. 2nd. In resonance or in Accord; it is in this way that a consonant *Interval* differs from a dissonant one. 3rd. In quantity; as a simple *Interval* differs from a compounded *Interval*. 4th. In Genre; it is thus that Diatonic, Chromatic, and Enharmonic *Intervals* differ from one another. 5th. In the nature of the ratio; as the *Interval* whose ratio can be expressed in numbers differs from an irrational *Interval*. Let us say some words about these differences.

I. The smallest of all the *Intervals*, according to Baccheius and Gaudentius,<sup>51</sup> is the Enharmonic Diesis. The largest, taking it at the extreme low end of the Hypodorian Mode to the extreme high end of the Hypomixolydian, would be three complete Octaves; but as there is a Fifth to omit, or even a Sixth, according to a passage from Adrastus cited by Meibomius,<sup>52</sup> beyond the Dis-Diapason, that is, an Eighteenth, the Fourth remains as the largest *Interval* of the Diagram of the Greeks.

II. The Greeks divided *Intervals* into Consonant and Dissonant, as we do; but their divisions were not the same as ours. (See CONSONANCE\* [*Consonnance*].) They further subdivided consonant *Intervals* into two types, without including in them the Unison, which they called *Homophonia*, or a parity of Sounds, and whose *Interval* is null. The first type was *Antiphonia*, or an opposition of Sounds, which is done at the Octave or at the double Octave, and which was strictly speaking only a Replica of the same Sound; but nevertheless with an opposition of low to high. The second type was the *Paraphonia*, or a distinction of Sounds, under which they comprehended every Consonance other than the Octave and its Replicas; all *Intervals*, says Theon of Smyrna,<sup>53</sup> which are neither Dissonants nor Unison.

III. When the Greeks speak of their *Diastemas* or simple *Intervals*, this term must not be taken in all strictness; for the Diesis itself is not, according to them, exempt from complexity; but it must always be related to the Genre to which the *Interval* applies. For example, the Semitone is a simple *Interval* in the Chromatic Genre and in the Diatonic, compounded in the Enharmonic. The *Tone* is compounded in the Chromatic, and simple in the Diatonic; and the Ditonon itself, or the Major Third, which is a compounded *Interval* in the Diatonic, is uncompounded in the Enharmonic.



Thus, what is a systema in one Genre can be a Diastema in another, and reciprocally.

IV. Concerning the Genres, successively divide the same Tetrachord according to the Diatonic Genre, according to the Chromatic Genre, and according to the Enharmonic, and you will have three different accords, which, when compared to one another, instead of three *Intervals*, will give you nine of them, aside from the combinations and compositions which can be made of them, and the differences of all those *Intervals*, which will produce many others. If you compare, for example, the first *Interval* of each Tetrachord in the Enharmonic and in Aristoxenus' soft Chromatic, you will have on the one side a fourth, or  $3/12$  of a Tone, on the other a third, or  $4/12$ , and the two high Strings will between them produce an *Interval* that will be the difference of two preceding ones, or the twelfth part of a Tone.

V. Passing now to the ratios, this Point leads me to a small digression.

The Aristoxenians claimed to have quite simplified Music by their equal divisions of the *Intervals*, and made a great deal of fun of Pythagoras' calculations. It nevertheless seems to me that this pretended simplicity hardly existed except in the words, and that if the Pythagoreans had understood their Master and Music a little better, they would have soon shut their adversaries' mouths.

Pythagoras had not thought up the ratio of the Sounds he first calculated. Guided by experience, he only took note of his observations. Aristoxenus, inconvenienced by all these calculations, built an entirely different system in his head; and as if he might change Nature at his pleasure for having simplified the words, he believed he had simplified the things, whereas he had actually done the contrary.

As the ratios of Consonances were simple and easy to express, these two Philosophers were in agreement about these; it was likewise for the first Dissonances, for they likewise both agreed that the *Tone* was the difference between the Fourth and the Fifth; but yet how to determine this difference otherwise than by calculation? Aristoxenus nevertheless departed from that because he did not want to calculate, and he built his whole musical doctrine upon this *Tone*, whose ratio he prided himself on not knowing. What was easier to do than to show him the falsity of his procedures and the precision of those of Pythagoras? But, he would have said, I always take the doubles, or the halves, or the thirds; that is simpler and sooner done than your Commas, your Limmas, your Apotomes. I admit it, Pythagoras might have answered; but, tell me, please, how you take them, those doubles, those halves, those thirds? The other might have replied that he sounded them naturally, or that he took them on his

Monocord.<sup>54</sup> Well! Pythagoras might have said, sound for me exactly one quarter of a Tone. If the other were enough of a charlatan to do so, Pythagoras would have added: but is your Monocord correctly divided? Show me, please, what method have you used to take a quarter or a third of a Tone? I cannot see, in such a case, what Aristoxenus could have answered. For, to say that the Instrument had been tuned to the Voice, aside from falling into a circular reasoning, could not suit the Aristoxenians, since they wholly agree with their Leader that the Voice must be long trained on an Instrument of the utmost precision in order to attain to the point of intoning correctly the *Intervals* of the soft Chromatic and of the Enharmonic Genre.

Now, since one needs not only complex calculations and even more difficult geometrical operations in order to measure Aristoxenus' thirds and fourths of a Tone than to assign Pythagoras' ratios, it is with reason that Nicomachus, Boethius, and several other Theorists preferred the exact and harmonic ratios of their Master to the divisions of the Aristoxenian system, which were not simpler, and which did not give any *Interval* in the exactitude of its generation.

It must be noted that those reasonings that suited the Music of the Greeks would not equally suit our own, because all the Sounds of our system are put into accord by Consonances, which could not be done in theirs except for the Diatonic Genre alone.

It follows from all this that Aristoxenus reasonably distinguished *Intervals* into rational and irrational; since, although they may all be rational in Pythagoras' system, the majority of Dissonances were irrational in his own.

In modern Music *Intervals* are also considered in several manners; namely, either generally as some space or distance between two given Sounds, or as only those distances that can be notated, or, finally, as those which are marked at different Degrees. According to the first sense, every numerical ratio, as is the Comma, or muted one, as is Aristoxenus' Diesis, can express an *Interval*. The second sense applies only to the *Intervals* received in the system of our Music, the least of which is the minor Semitone expressed in the same Degree by a Sharp or by a Flat. (See SEMITONE [*Semi-ton*].) The third acceptance assumes some difference in position: that is, one or more Degrees between the two Sounds that form the *Interval*. It is in this last acceptance that the word is established in practice: so that two equal *Intervals*, such as the False Fifth and the Tritone are, nevertheless carry two different names, if the one has more Degrees than the other.

We divide, as the Ancients did, *Intervals* into Consonant and Disso-

nant. Consonances are perfect or imperfect (See CONSONANCE\* [*Consonance*].) Dissonances are such by their nature, or become so by accidentals. There are only two dissonant *Intervals* by their nature, namely, the second and the seventh, including therein their Octaves or Replicas; these two can be further reduced to a single one; but all Consonances can become dissonant by accidentals. (See DISSONANCE\* [*Dissonance*].)

Furthermore, every *Interval* is simple or doubled. The simple *Interval* is that which is contained within the limits of the Octave. Every *Interval* that exceeds this range is doubled, that is, compounded of one or more Octaves and of the simple *Interval* of which it is the Replica.

Simple *Intervals* are further divided into direct and inverted. Take for a direct one any simple *Interval* whatsoever: its complement at the Octave is always inverted from this one, and reciprocally so.

There are only six types of simple *Intervals*, of which three are complements of the three others at the Octave, and consequently also their inversions. If you first take the smallest *Intervals*, you will have, for the direct ones, the Second, the Third, and the Fourth; for inverted ones, the Seventh, the Sixth, and the Fifth. Let the latter be direct, the others will be inverted: everything is reciprocal.

In order to find the name of any *Interval* whatsoever, one need only add one unit to the number of the Degrees it contains. Thus, the *Interval* of one Degree will give the Second; of two, the Third; of three, the Fourth; of seven, the Octave; of nine, the Tenth; etc. But this is not enough to determine an *Interval* completely: for under the same name it can be major or minor, just or false, diminished or augmented.

Imperfect Consonances and the two natural Dissonances can be major or minor, which, without changing the Degree, produces the difference of a Semitone in the *Interval*. If one reduces a minor *Interval* by a further Semitone, this *Interval* becomes diminished. If one augments a major *Interval* by a Semitone, it becomes augmented.

Perfect Consonances are invariable by their nature. When their *Interval* is what it should be, they are called *Just*. If one alters this *Interval* by a Semitone, the Consonance is called *False* and becomes a Dissonance; *augmented* if augmented by a Semitone; *diminished* if it is reduced. The name of False Fifth is given inappropriately to the Diminished Fifth; this is to take the Genre for the species: the Augmented Fifth is as wholly false as the diminished, and it is even more so in every regard.

A Table will be found (Plate C, Figure 2) of all the simple *Intervals* practicable in Music, with their names, their Degrees, their values, and their ratios.

Concerning this Table it must be noted that the *Interval* called the *Aug-*

TABLE  
OF ALL THE SIMPLE INTERVALS PRACTICABLE IN MUSIC

INTERVAL expressed in Notes	NAME of the interval	DEGREES it contains	VALUE in Tones and Semitones	RATIO in Numbers
Do #—re ♭	Diminished Second	1	0	375–384
Si —do	Minor Second	1	1 Semitone	15– 16
Do —re	Major Second	1	1 Tone	8– 9
Do —re #	Augmented Second	1	1½ Tone	64– 75
Si —re ♭	Diminished Third	2	1 Tone	125–144
Mi —sol	Minor Third	2	1½ Tone	5– 6
Do —mi	Major Third	2	2 Tones	4– 5
Fa —la #	Augmented Third	2	2½ Tones	96–125
Do #—fa	Diminished Fourth	3	2 Tones	75– 96
Do —fa	Just Fourth	3	2½ Tones	3– 4
Do —fa #	Augmented Fourth, called a Tritone	3	3 Tones	32– 45
Fa # —do	Diminished Fifth, called a False Fifth	4	3 Tones	45– 64
Do —sol	Just Fifth	4	3½ Tones	2– 3
Do —sol #	Augmented Fifth	4	4 Tones	16– 25
La # —fa	Diminished Sixth	5	3½ Tones	125–192
Mi —do	Minor Sixth	5	4 Tones	5– 8
Sol —mi	Major Sixth	5	4½ Tones	3– 5
Re ♭ —si	Augmented Sixth	5	5 Tones	72–125
Re # —do	Diminished Seventh	6	4½ Tones	75–128
Mi —re	Minor Seventh	6	5 Tones	5– 9
Do —si	Major Seventh	6	5½ Tones	8– 15
Sol ♭ —fa #	Augmented Seventh	6	6 Tones	81–160
Do —do	Octave	7	6 Tones	1– 2

*Plate C, Figure 2*

*mented Seventh* by Harmonists is merely a Major Seventh with a particular Accompaniment—the genuine Augmented Seventh, such as it is marked in the Table, not having any place in Harmony, or having a place in it only successively, as an Enharmonic transition, never strictly speaking in the same Chord.

It will also be observed that the majority of these ratios can be determined in several ways; I have preferred the simplest, and that which gives the smallest numbers.

In order to compound or double one of these simple *Intervals*, it suffices to add the Octave to it as many times as one likes, and to have the name of this new *Interval*, one must add seven to the name of the simple *Interval* as many times as it contains Octaves. Reciprocally, to know the simple of a doubled *Interval* whose name one has, one must subtract seven from it as many times as one can; the remainder will give the name of the simple *Interval* that produced it. Do you want a doubled Fifth, that is, the Octave of the Fifth, or the Fifth of the Octave? To 5 add 7, you will have 12. The doubled Fifth is thus a Twelfth. In order to find the simple of a Twelfth, subtract 7 from the number 12 as many times as you can, the remainder 5 gives you a Fifth. With regard to the ratio, one need only double the second term, or take the half of the first term of the simple ratio as many times as Octaves are added, and one will have the ratio of the doubled *Interval*. Thus, 2, 3, being the ratio of the Fifth, 1, 3, or 2, 6, will be that of the Twelfth, etc. Concerning which it will be observed that in Musical terms, to compound or double an *Interval*, is not to add it to itself, it is to add to it an Octave; to triple it is to add two, etc.

I should warn here that all the *Intervals* expressed in this Dictionary by the names of Notes should always be counted from low to high, so that this *Interval*, *do si*, is not a Second, but a Seventh; and *si do*, is not a Seventh, but a Second.

LICENCE [*License*], *n. fem.* A liberty which the Composer takes and which seems contrary to the rules, even though it might lie in the principle of the rules; for this is what distinguishes *Licenses* from mistakes. For example, it is a rule in composition not to ascend from the Minor Third or from the Minor Sixth to the Octave. This rule derives from the law of harmonic connection and from that of Preparation. When, therefore, one ascends from the Minor Third or from the Minor Sixth to the Octave in such a way that there is nonetheless a connection between the two Chords, or so that the Dissonance is prepared by it, one takes a *License*; but if there is neither connection nor preparation, one makes a mistake. Likewise, it is a rule not to compose two just Fifths in succession between the same Parts, especially by a similar movement; the principle of this rule is in the law of the unity of the Mode. Every time, then, that one can compose these two Fifths without making two Modes felt at the same time, there is a *License*, but there is no mistake. This explanation was necessary because Musicians have no very clear idea of this word *License*.

As the majority of the rules of Harmony are founded on arbitrary principles and change by custom and the taste of Composers, it thereby happens that these rules vary, are subject to Fashion, and that what is a *License*

at one Time is not such in another. Two or three centuries ago it was not permitted to produce two Thirds in succession, especially of the same type. Now entire pieces are written that are made up entirely of Thirds. Our ancients did not permit three consecutive Tones to be sounded diatonically. Today we sound them without scruple and without difficulty as much as the Modulation permits. It is the same with false Relations, with synco-pated Harmony, and with a thousand other accidents of composition which at first were mistakes, then *Licenses*, and today have nothing irregular about them.

MELODY [*Mélodie*], *n. fem.* A succession of Sounds so ordered according to the laws of Rhythm and of Modulation that they constitute a pleasant meaning<sup>55</sup> for the ear. Vocal *Melody* is called Song, and Instrumental, Symphony.

The idea of Rhythm necessarily enters into that of *Melody*; a Song is a Song only inasmuch as it is measured; the same succession of Sounds can receive as many characters, as many different *Melodies* as it can be differently scanned, and the sole change of the value of the Notes can alone disfigure this same succession to the point of rendering it unrecognizable. Thus, *Melody* is nothing by itself; it is the measure which determines it, and there is no Song without a Beat. *Melody* should therefore not be compared with Harmony, an abstraction made from the Measure in them both, for it is essential to the one and not to the other.

*Melody* is related to two different principles, according to the manner in which it is considered. Taken by the relationships of Sounds and by the rules of the Mode, it has its principle in Harmony, since it is a harmonic analysis that produces the Degrees of the Scale, the Pitches of the Mode, and the laws of the Modulation—the unique elements of Song. According to this principle, the whole force of the *Melody* is limited to flattering the ear by pleasant Sounds, as one can flatter sight by the pleasant accords of colors; but taken as an art of imitation by which one can affect the mind by various images, move the heart by various feelings, arouse and calm the passions, work, in a word, moral effects which pass beyond the immediate empire of the senses, another principle must be sought for it: for no hold is seen by which Harmony alone, and all that comes from it can affect us in this way.

What is this second principle? It is in Nature as well as the first; but in order to discover it a more subtle, although simpler, observation and more sensitivity in the observer are needed. This principle is the same one that makes the Tone of the Voice vary when one speaks according to the things one says and the movements one experiences while saying them. It is the

accent of Languages that determines the *Melody* of each Nation; it is the accent that makes one speak while singing, and speak with more or less energy according to whether the Language has more or less Accent. The one in which the Accent is more marked should produce a more lively and more passionate *Melody*; the one in which there is but little Accent or none at all can have merely a languishing and cold *Melody*, without character and without expression. These are the true principles: as long as a person departs from them and wants to speak of the power of Music over the human heart he will speak without understanding, he will not know what he is saying.

If Music depicts only by means of *Melody* and draws all its force from it, it follows that all Music that does not sing, however harmonious it may be, is not at all an imitative Music, and, not being able either to touch or to depict with its beautiful Chords, it soon wearies the ears and always leaves the heart cold. It further follows that, in spite of the diversity of the Parts which Harmony has introduced, and which are so abused today, as soon as two *Melodies* are made to be heard at the same time, they obliterate one another and remain without any effect, however beautiful they may each be separately—from which it can be judged with what taste French Composers have introduced into their Opera the custom of making an Aria serve as an Accompaniment to a Chorus or to another Aria, which is as if one took it into one's head to recite two speeches at the same time in order to give more force to their eloquence. (See UNITY OF MELODY\* [*Unité de mélodie*].)

MODE [*Mode*], *n. masc.* The regular disposition of the Song and of the Accompaniment relative to certain principal Sounds based on which a Piece of Music is constituted and which are called the essential Pitches of the *Mode*.

The *Mode* differs from the Key in that the latter indicates only the Pitch, or the place in the system which should serve as a the basis for the Song, and the *Mode* determines the Third and modifies the entire Scale on this fundamental Sound.

Our *Modes* are not founded on any characteristic feeling like those of the Ancients, but uniquely on our harmonic system. The Pitches essential to the *Mode* are three in number, and together form a perfect Chord. 1st. The Tonic, which is the fundamental Pitch of the Key and of the *Mode*. (See KEY [*Ton*] and TONIC [*Tonique*].) 2nd. The Dominant on the Fifth of the Tonic. (See DOMINANT [*Dominante*].) 3rd. Finally, the Mediant, which specifically constitutes the *Mode* and which is on the Third of this same Tonic. (See MEDIANT [*Médiant*].) As this Third can be of two types, there



are therefore two different *Modes*. When the mediant makes a Major Third with the Tonic, the *Mode* is major; it is minor when the Third is minor.

The Major *Mode* is immediately engendered by the resonance of the sounding body, which produces the Major Third of the fundamental Sound; but the Minor *Mode* is not at all given by Nature: it is found only by analogy and inversion. This is true in M. Tartini's system as well as in M. Rameau's.

This latter Author has explained this origin of the Minor *Mode* in different ways in his various works, one after another, none of which has contented his Interpreter, M. d'Alembert. This is why M. d'Alembert founds this same origin on another principle, which I cannot better explain than by transcribing it in this great Geometer's own terms.

"In the Song *do mi sol*, which constitutes the Major *Mode*, the Sounds *mi* and *sol* are such that the principal sound *do* causes these two to resonate, but the second Sound *mi* does not at all cause *sol*, which is only its Minor Third, to resonate.

"Now, let us imagine that instead of this Sound *mi* another Sound were placed between the Sounds *do* and *sol* that had, just like the Sound *do*, the property of causing *sol* to resonate, and which was nevertheless different from *do*; this Sound that is sought should be such that it has for its Major Seventeenth the Sound *sol* or one of the octaves of *sol*; consequently, the Sound sought should be on the Major Seventeenth below *sol*, or, what amounts to the same thing, on the Major Third below this same Sound *sol*. Now, the Sound *mi* being on the Minor Third below *sol*, and the Major Third being a Semitone larger than the Minor Third, it follows that the Sound that is sought will be a Semitone lower than the *mi*, and will consequently be *mi*-Flat.

"This new arrangement *do, mi*-Flat, *sol*, in which the Sounds *do* and *mi*-Flat both cause *sol* to resonate without *do* causing *mi*-Flat to resonate, is not, in truth, as perfect as the first arrangement *do, mi, sol*, because in the latter the two Sounds *mi* and *sol* are both engendered by the principal Sound *do*, whereas in the former the Sound *mi*-flat is not engendered by the Sound *do*; but this arrangement *do, mi* flat, *sol*, is also dictated by Nature, although less immediately than the first; and in fact experience proves that the ear accommodates itself to it nearly as well.

"In the Song *do, mi*-flat, *sol, do*, it is obvious that the Third of *do* on *mi*-Flat is minor, and such is the origin of the genre or *Mode* called *Minor*." *Elements of Music*, p. 22.<sup>56</sup>

The *Mode* once determined, all the Sounds of the Scale take a name relative to the fundamental and belonging to the place they occupy in that *Mode*. These are the names of all the Notes relative to their *Mode*, taking

the Octave *do* as an example for the Major *Mode* and that of *la* as an example of the Minor *Mode*.

Major	<i>Do</i>	<i>Re</i>	<i>Mi</i>	<i>Fa</i>	<i>Sol</i>	<i>La</i>	<i>Si</i>	<i>Do</i>
Minor	<i>La</i>	<i>Si</i>	<i>Do</i>	<i>Re</i>	<i>Mi</i>	<i>Fa</i>	<i>Sol</i>	<i>La</i>
	Tonic	Second Note	Mediant	Subdominant	Fourth Note or Dominant	Superdominant	Sixth Note or Seventh Note	Octave

It must be noted that when the seventh Note is only a Semitone from the Octave, that is when it constitutes the Major Third of the Dominant, as *si*-natural in major or *sol*-Sharp in minor, then this seventh Note is called the Leading Tone, because it announces the Tonic and causes the Key to be perceived.<sup>57</sup>

Not only does each Degree take the name that suits it, but each interval is determined relative to the *Mode*. These are the established rules for this.

1st. The second Note should form a Major Second on the Tonic; the fourth one and the Dominant a just Fourth and Fifth, and that likewise in the two *Modes*.

2nd. In the major *Mode* the Mediant or Third, the Sixth and the Seventh of the Tonic should always be major—it is the character of the *Mode*. By the same reason, these three Intervals should be minor in the minor *Mode*; nevertheless, as the Leading Tone must also be perceived in it, which cannot be done without a false relation while the sixth Note remains minor, this produces exceptions to which one must pay attention in the Course of the Harmony and of the Song, but the Clef with its transpositions must always produce all the Intervals determined in relation to the Tonic according to the type of *Mode*. A general rule for this will be found at the word CLEF [Clef].

As all the natural Pitches of the Octave of *do* give, relative to this Tonic, all the Intervals prescribed for the Major *Mode*, and as it is likewise for the Octave *la* for the Minor *Mode*, the preceding example, which I have put forward only for the names of the Notes, should also serve as a formula for the rule of Intervals in each *Mode*.

This rule is not at all established on purely arbitrary Principles, as might be believed: it has its foundation in the harmonic generation, at least up to a certain point. If you produce the Perfect Major Chord on the Tonic, on the Dominant, and on the Subdominant, you will have all the Sounds of

the Diatonic Scale for the Major *Mode*; in order to have that for the Minor *Mode*, always leaving the Major Third to the Dominant, you produce the Minor Third on the two other Chords. Such is the analogy of the *Mode*.

As this mixture of major and minor Chords introduces a false relation between the sixth Note and the Leading Tone into the Minor *Mode*, in order to avoid this false relation sometimes the Major Third is produced on the fourth Note when ascending or the Minor Third on the Dominant when descending, especially by inversion, but these are then exceptions.

There are strictly speaking only two *Modes*, as has just been seen; but, as there are twelve fundamental Sounds which give as many Keys in the system, and as each of these Keys is susceptible of the Major *Mode* and of the Minor *Mode*, one can compose in twenty-four *Modes* or manners—*Maneries*, our old Authors said in their Latin. There are even thirty-four of them possible in the manner of Notating them, but ten of them are excluded in practice, which are at bottom merely the repetitions of ten others, under much more difficult relations, in which all the Pitches would change names and in which it would be difficult to recognize them. Such are the Major *Modes* on sharp Notes and the Minor *Modes* on Flat ones. Thus, instead of composing a Major Third in *sol*-Sharp, you will compose in *la*-Flat, which gives the same keys on the keyboard, and instead of composing in *re*-Flat minor, you will take *do*-Sharp for the same reason, namely, so as to avoid in the one case an F double-Sharp, which would become a G natural, and in the other a B double-Flat, which would become an A natural.

One does not always remain in the same Key or in the same *Mode* in which one began a Tune; but, whether for expression or for variety, the Key and the *Mode* are changed according to harmonic analogy, always returning nonetheless to the one that was first heard, which is called *Modulating*.

From thence arises a new distinction of the *Mode* into *principal* and *relative*. The principal is that in which the Piece begins and ends; the relatives are those which are intermixed with the principal one in the course of the Modulation. (See MODULATION\* [*Modulation*].)

In 1751, Mr. Blainville, a learned Musician from Paris, proposed to attempt a Third *Mode* which he called a *Mixed Mode* because it participates in the Modulation of the two others, or, rather, because it is comprised of them—a mixture the Author does not at all regard as an inconvenience, but rather as an advantage and a source of variety and of liberty in the Songs and in the Harmony.<sup>58</sup>

This new *Mode*, not at all being produced by the analysis of three Chords like the other two, is not determined like them by the Harmonics

essential to the *Mode*, but by an entire Scale which belongs to it, in ascending as well as in descending; so that, in our two *Modes* the Scale is produced by the Chords, and in the mixed *Mode* the Chords are produced by the Scale.

The formulation of this Scale is in the ascending and descending series of the following Notes:

*Mi Fa Sol La Si Do Re Mi*

whose essential difference is, as regards the Melody, in the position of the two Semitones, of which the first is found between the Tonic and the second Note and the other between the fifth and the sixth ones; and, as regards Harmony, in that it carries on its Tonic the Minor Third when beginning and the major when ending, as one can see (Plate L, Figure 5) in the Accompaniment of this Scale, in ascending as well as descending, such as it was given by the Author and performed at the *Concert Spirituel*, 30 May 1751.

It is objected to Mr. Blainville that his *Mode* has no essential Chord or Pitch or Cadence that belongs to it, and that sufficiently distinguishes it from the major or minor *Modes*. He responds to this that the difference of his *Mode* is less in the Harmony than in the Melody, and less in the *Mode* itself than in the Modulation; that it is distinguished in its beginning from the major *Mode*, by its Minor Third, and in its ending in the minor *Mode* by its plagal Cadence. To which it is replied that a Modulation that is not exclusive does not suffice to establish a *Mode*, that his is inevitably in the other two *Modes*, especially in the minor; and as for its plagal Cadence, that it necessarily has a place in the same minor *Mode* every time one passes from the Chord of the Tonic to that of the Dominant, as this was formerly practiced, even in finales, in the Plagal *Modes* and in the Quarter Tone.



Plate L, Figure 5

From which it is concluded that his mixed *Mode* is less a particular type than a new denomination for ways of intermixing and combining the major and minor *Modes*, as ancient as Harmony, practiced in all times; and this appears so true that, even in beginning his Scale, the Author does not dare to give either the Fifth or the Sixth to his Tonic for fear of determining a Tonic in the minor *Mode* by the first or a Mediant in the major *Mode* by the second. He leaves the equivocation by not filling out his Chord.

But, whatever objection may be made against the mixed *Mode*, whose name rather than its practice is rejected, this will not prevent the manner in which the Author establishes it and treats it from making him known as a man of intelligence and a Musician well versed in the principles of his Art.

The Ancients disagree prodigiously among themselves over the definitions, the divisions, and the names of their Keys or *Modes*. Obscure in all the parts of their Music, they are almost unintelligible in this one. All agree, it is true, that a *Mode* is a certain system or a constitution of Sounds, and it appears that this constitution is nothing in itself but a certain Octave filled by all the intermediary Sounds, according to the Genre. Euclid and Ptolemy<sup>59</sup> seem to make it consist in the various positions of the two Semitones of the Octave relative to the principal Pitch of the *Mode*, as is still seen today in the eight Tones of Plain-Song; but the greater number appear to place this difference uniquely in the place the Diapason of the *Mode* occupies in the general system, that is, in that the Bass or principal Pitch of the *Mode* is higher or lower, being taken in various places of the system, with all the Pitches of the Series always maintaining the same relationship with the fundamental, and consequently changing Chord at each *Mode* so as to preserve the analogy of this relation. This is the difference of the Keys in our Music.

According to the first meaning, there would be only seven possible *Modes* in the Diatonic system, and, in fact, Ptolemy did not accept any more than this: for, there are only seven ways of varying the position of two Semitones relative to the fundamental Sound while always keeping the prescribed Interval between these two Semitones. According to the second meaning, there would be as many *possible Modes* as there are Sounds, that is, an infinite number; but if one likewise restricts oneself to the Diatonic system, no more than seven will be found, at least if one does not want to take as new *Modes* those which would be established on the Octave of the first ones.

By combining these two approaches, one still has need of only seven *Modes*; for if one takes these *Modes* in the various places of the system, one finds at the same time the fundamental Sounds distinguished from low to high, and the two Semitones differently situated relative to the principal Sound.

But besides these *Modes*, several others can be formed by taking different Sounds for the essential Pitches of the *Mode* in the same Series and on the same fundamental Sound. For example, when the Fifth of the principal Sound is taken as Dominant, the *Mode* is Authentic; it is Plagal if the Fourth is chosen; and these are strictly speaking two different *Modes* on the same fundamental. Now, as in order to constitute a pleasant *Mode*, it is necessary, say the Greeks, for the Fourth and the Fifth to be just, or at least one of the two, it is evident that there are only five fundamental Sounds in the range of the Octave on each of which an Authentic and a Plagal *Mode* may be established. Aside from these ten *Modes*, two more are found: one Authentic, which cannot furnish a Plagal because its Fourth produces the Tritone; another Plagal, which cannot furnish an Authentic because its Fifth is false. It is perhaps in this way that a passage in Plutarch must be understood in which Music complains that Phrynis has corrupted it by wanting to derive twelve different Harmonies from five Pitches, or rather seven.<sup>60</sup>

These, then, are the twelve *Modes* possible in the range of one Octave or of two non-adjoining Tetrachords: if one is going to join the two Tetrachords, that is, to give a Flat to the Seventh while omitting the Octave, or if one divides the whole *Tones* by Chromatic Intervals in order to introduce into them new, intermediary *Modes*, or if, paying attention only to the differences from low to high, other *Modes* are placed at the Octave of the preceding ones, all this will furnish various means of multiplying the number of *Modes* well beyond twelve. And these are the only ways of explaining the various number of *Modes* accepted or rejected by the Ancients at various times.

Ancient Music, having at first been confined within the strict limits of the Tetrachord, the Pentachord, the Hexachord, the Heptachord, and the Octachord, at first only three *Modes* were accepted whose fundamentals were one *Tone* distant from one another. The lowest of the three was called the *Dorian*; the *Phrygian* held the middle place; the highest was the *Lydian*. By dividing each of these *Tones* into two Intervals, room was made for two other *Modes*, the Ionian and the Aeolian, the first of which was inserted between the Dorian and the Phrygian and the second between the Phrygian and the Lydian.

Later on, the system being extended on the high and the low ends, Musicians established, on each side, new *Modes* which derived their denomination from the first five by joining to them the preposition *Hyper*, *super*, for those on the high end and the preposition *Hypo*, *sub* for the two on the low end. Thus, the Lydian *Mode* was followed by the Hyperdorian, the Hyperionian, the Hyperphrygian, the Hyperaeolian, and the Hyperlydian in ascending; and after the Dorian *Mode* came the Hypolydian, the Hypo-

aeolian, the Hypophrygian, the Hypoionian, and the Hypodorian in descending. The enumeration of these fifteen *Modes* is found in Alypius, a Greek Author.<sup>61</sup> (See Plate E for their order and their Intervals expressed by the names of the Notes of our Music.) But it must be noted that the Hypodorian was the sole Mode that was performed in its entire range: in proportion as the others rose, Sounds on the high end were omitted in order not to exceed the range of the Voice. This observation serves to make intelligible other passages from the Ancients by which they seem to say that the lowest *Modes* had a higher Song: which was true in that these Songs were further raised above the Tonic. For not having understood this, *Doni* has been awfully perplexed about these apparent contradictions.<sup>62</sup>

Of all these *Modes* Plato rejected several as capable of corrupting morals.<sup>63</sup> According to Euclid, Aristoxenus permitted only thirteen of them, suppressing the two most elevated ones, namely the Hyperaeolian and the Hyperlydian, but in the work of Aristoxenus that remains to us he names only six, about which he reports the various sentiments which already reigned in his time.<sup>64</sup>

Finally, Ptolemy reduced the number of these *Modes* to seven, saying that the *Modes* were not introduced with the intention of varying the Songs according to low and high, for it is obvious that they might have been multiplied well beyond fifteen, but rather in order to facilitate the transition from one *Mode* to another by consonant and easily sounded Intervals.<sup>65</sup>

He therefore confined all the *Modes* within the space of one Octave, in which the Dorian *Mode* acted as the center, so that the Mixolydian was a Fourth above and the Hypodorian a Fourth below, the Phrygian a Fifth above the Hypodorian, the Hypophrygian a Fourth below the Phrygian, and the Lydian a Fifth above the Hypophrygian; from which it appears that, counting from the Hypodorian, which is the lowest *Mode*, to the Hypophrygian, there was an Interval of one *Tonos*; from the Hypophrygian to the Hypolydian another *Tonos*, from the Hypolydian to the Dorian one semi-*Tonos*, from this to the Phrygian one *Tonos*, from the Phrygian to the Lydian one more *Tonos*; from the Phrygian to the Mixolydian one semi-*Tonos*, which makes up the range of a Seventh, in this order:

7	6	5	4	3	2	1
<i>Sol</i>	<i>La</i>	<i>Si</i>	<i>Do</i>	<i>Re</i>	<i>Mi</i>	<i>Fa</i>
Hypodorian	Hypophrygian	Hypolydian	Dorian	Phrygian	Lydian	Mixolydian



# GENERAL TABLE OF ALL THE MODES OF ANCIENT MUSIC

N.B. As Authors have given various names to the majority of these Modes, the least used names have been placed in smaller characters.

LOW			MEDIUM			HIGH		
1	La . . . . .	Hypodorian Common Locrian	6	Re. . . . .	Dorian Hypomixolydian	11	Sol . . . . .	Hyperdorian Mixolydian
2	Si-flat . . . . .	Hypoionian Hypoastian Low Hypophrygian	7	Mi-flat . . . . .	Ionian Iastian Low Phrygian	12	La-flat . . . . .	Hyperionian Hyperastian High Mixolydian
3	Si . . . . .	Hypophrygian	8	Mi . . . . .	Phrygian	13	La . . . . .	Hyperphrygian Hypermixolydian*
4	Do . . . . .	Hypoacolian Low Hypolydian	9	Fa . . . . .	Acolian Low Lydian	14	Si-flat . . . . .	Hyperaeolian
5	Do-sharp	Hypolydian	10	Fa-sharp . . .	Lydian	15	Si . . . . .	Hyperlydian

\* I place the Hypermixolydian Mode here, finding it noted this way in my notebooks under the citation of Euclid. But the true place of this Mode should, it seems to me, be a semitone above the Hyperlydian; thus, I think that Euclid is mistaken or that I have transcribed him incorrectly.

Ptolemy eliminated all the other *Modes*, claiming that a greater number of them cannot be placed in the diatonic system of one octave, all the Pitches which composed it being found to be employed. It is these seven *Modes* of Ptolemy which, by joining to them the Hypomixolydian—added, it is said, by Aretino<sup>66</sup>—today make up the eight Tones of Plain-Song. (See TONES OF THE CHURCH [*Tons de l'Église*].)

Such is the clearest notion that can be drawn from the Keys or *Modes* of ancient Music, so long as they were regarded as differing from one another only from low to high; but they also had other differences which characterized them more particularly, regarding expression. They were derived from the genre of Poetry which was put into Music, from the type of Instrument which should accompany it, from the Rhythm or the Cadence which was observed in it, from the use certain Songs had among certain Peoples and from which the names of the principal *Modes* originally came: the Dorian, the Phrygian, the Lydian, the Ionian, the Aeolian.

There were also other sorts of *Modes* that might be better called *Styles* or *genres* of composition: such were the tragic *Mode* destined for the theater, the Nomic *Mode* consecrated to Apollo, the Dithyrambic to Bacchus, etc. (See STYLE [*Style*] and MELOPOEIA [*Mélopée*].)

In our ancient Musics, certain ways of establishing the relative value of all the Notes in relation to the *Mensura* or the *Tempus* by a general sign were also called *Modes*. The *Mode* was then nearly what the Meter is today; it was marked in the same way according to the Clef, at first by circles or semicircles, dotted or without dots, followed by the numerals 2 or 3 variously combined, to which various perpendicular lines differing in number or in length were afterward added or substituted, according to the *Mode*; and it is from this antique usage that the use of C and C barred has been left to us. (See PROLATION [*Prolation*].)

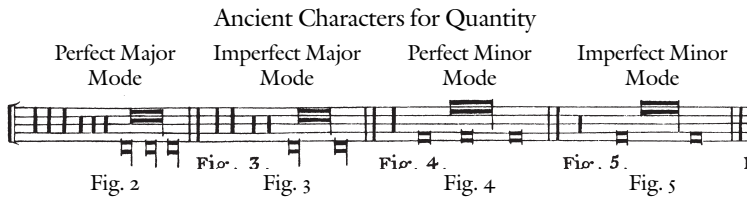
There were in this sense two sorts of *Modes*: the major, which was related to the Maxima Note, and the minor, which was for the Longa. Both were divided into perfect and imperfect.

The Perfect Major *Mode* was marked with three lines or staves that each filled three spaces of the Staff, and three others that filled only two; under this *Mode* the Maxima was worth three Longae. (See Plate B, Figure 2.)

The Imperfect Major *Mode* was marked by two lines that each spanned three spaces, and two others that spanned only two; and then the Maxima was worth only two Longae. (Figure 3.)

The Perfect Minor *Mode* was marked by a single line that spanned three spaces, and the Longa was worth three Breae. (Figure 4.)

The Imperfect Minor *Mode* was marked by a single line that spanned only two spaces, and its Longa was worth only two Breae. (Figure 5.)



*Plate B, Figures 2–5*

The Abbé Brossard<sup>67</sup> inappropriately mixed Circles and semi-Circles with the shapes for these *Modes*. These signs brought together have never had a place in the simple *Modes*, but only when the Mensura were double or conjunct.

All this has not been in use for a long time, but these signs must necessarily be understood in order to know how to decipher ancient Musical pieces; about which the most learned Musicians are often quite perplexed.

MODULATION [*Modulation*], *n. fem.* Is properly speaking the manner of establishing and treating the Mode, but this word is taken more commonly today for the art of directing the Harmony and the Song successively in several Modes in a manner pleasant to the ear and conformable to the rules.

If the Mode is produced by the Harmony, it is also from it that the laws of *Modulation* arise. These laws are simple to understand, but difficult to observe correctly. Here is what they consist in.

In order to modulate correctly in the same Key, it is necessary: 1st. To run through all its Sounds in a beautifully Singing manner, by striking the essential Pitches more often and stressing them still more, that is, the leading Chord and the Chord of the Tonic should be struck frequently, but under different aspects and by different routes in order to prevent monotony. 2nd. To establish Cadences, or closes, only on these two Chords, or at the very most on that of the Subdominant. 3rd. Finally, never to alter any of the Sounds of the Mode, for one cannot, without leaving it, make heard a Sharp or a Flat that does not belong to it, or to omit from it one which does belong to it.

But in order to pass from one Key to another, their analogy must be consulted, attention must be paid to the relationship of the Tonics and to the number of Pitches common to the two Keys.

Let us first begin from the major Mode. Whether the Fifth of the Tonic is considered as having the simplest of all the relations with it after that of the Octave or whether it is considered as the first of the Sounds which enters into the resonance of this same Tonic, it will always be found that

this Fifth, which is the Dominant of the Key, is the Pitch on which the *Modulation* most analogous to that of the principal Key can be established.

This Dominant, which made up a part of the perfect Chord of this first Tonic, also makes up part of its own, of which it is the fundamental Sound. There is therefore a connection between these two Chords. Furthermore, since this same Dominant like the Tonic contains a Perfect Major Chord by the principle of resonance, these two Chords differ from one another only by the Dissonance, which, from the Tonic passing to the Dominant, is the Added Sixth, and, from the Dominant passing again to the Tonic, is the Seventh. Now, these two Chords—distinguished in this way by the Dissonance which suits them both—form, by the Sounds that make them up them, ranked in order, precisely the Octave, or the Diatonic Scale which we call a Scale, which determines the Key.<sup>68</sup>

This same Scale of the Tonic, altered solely by a Sharp, forms the Scale of the key of the Dominant; which shows the great analogy of these two Keys and makes it easy to pass from the one to the other by means of a single alteration. The Key of the Dominant is therefore the first that presents itself after that of the Tonic in the order of *Modulations*.

The same simplicity of relationship we find between a Tonic and its Dominant is also found between the same Tonic and its Subdominant, for the Fifth which the Dominant produces with this Tonic on the treble, the Subdominant produces on the bass; but this Subdominant is Fifth of the Tonic only by inversion—it is directly a Fourth when placing this Tonic below, as it should be, which establishes the gradation of the ratios: for in this sense the Fourth, whose ratio is 3 to 4, immediately follows the Fifth, whose ratio is 2 to 3. If this Subdominant does not enter into the Chord in the same way as the Tonic, the Tonic on the contrary enters into its own. For let *do mi sol* be the Chord of the Tonic, that of the Subdominant will be *fa la do*; thus it is *do* that here makes the connection, and the two other Sounds of this new Chord are precisely the two Dissonances of the preceding ones. Moreover, it is not necessary to alter any more Sounds for this new Key than for that of the Dominant; all the same Pitches of the principal Key, or nearly so, are in both of them. Give a Flat to the Leading Tone *si*, and all the Notes of the Key of *do* will serve that of *fa*. The Key of the Subdominant is thus hardly less analogous to the principal Key than to that of the Dominant.

It should be further noted that after having made use of the first *Modulation* in order to pass from a principal Key *do* to that of its Dominant *sol*, one is obliged to employ the Second in order to return to the principal Key: for if *sol* is Dominant of the Key of *do*, *do* is Subdominant of the Key of *sol*; thus, one of these *Modulations* is no less necessary than the other.

The third Sound that enters into the Chord of the Tonic is that of its Third, or Mediant, and this is also the simplest of the ratios after the two preceding ones:  $2/3$ ,  $3/4$ ,  $4/5$ . This, then, is a new *Modulation* that presents itself, and all the more analogous as two of the Sounds of the principal Tonic also enter into the minor Chord of its Mediant; for the first Chord being *do mi sol*, this one will be *mi sol si*, where it is seen that *mi* and *sol* are common.

But what makes this *Modulation* a bit remote is the number of Sounds that must be altered in it, even for the minor Mode, which best suits this *mi*. I gave the formula for the Scale for the two Modes above: now, applying this formula to *mi* in minor Mode, one finds in truth only the fourth Sound *fa* altered by a Sharp in descending, but, in ascending, one also finds two others, namely, the principal Tonic *do* and its second Note *re*, which here becomes the Leading Tone. It is certain that the alteration of so many Sounds, and above all of the Tonic, makes the Mode remote and weakens the analogy.

If the Third is inverted as the Fifth was inverted, and this third is taken beneath the Tonic on the sixth Note *la*, which should also be called Submediant, or Mediant beneath, one will form a *Modulation* more analogous to the principal Key on this *la* than that of *mi*; for the Perfect Chord of this Submediant being *la do mi*, one will again find in it, as in that of the Mediant, two Sounds that enter into the Chord of the Tonic, namely *do* and *mi*; and furthermore, the Scale of the new Key being made up, at least in descending, of the same Sounds as that of the principal Key, and having only two Sounds altered in ascending, that is, one less than the Scale of the Mediant, it follows that the *Modulation* of the sixth Note is preferable to that of this Mediant, all the more so as the principal Tonic makes up one of the essential Pitches of the Mode, which is more appropriate for establishing the idea of the *Modulation*. The *mi* can come later.

Here then are four Pitches—*mi fa sol la*—on each of which one can modulate by starting from the major Key of *do*. There remain *re* and *si*, the two Harmonics of the Dominant. The latter one, as Leading Tone, cannot become Tonic by any good *Modulation*, at least immediately: this would be brusquely to apply ideas that are too opposed to the same Sound and to give it a Harmony that is too remote from the principal one. As for the second Note *re*, thanks to a consonant progression of the Fundamental Bass, one can also modulate in it by a Minor Third, provided that one remains on it but an instant so that there is no time to forget the *Modulation* of the *do*, which is itself altered; otherwise, instead of returning immediately in *do*, it would be necessary to pass through other intermediary Keys, where there would be danger of going astray.

By following the same analogies, one will modulate in the following order in order to begin from a minor Key: the Mediant first, then the Dominant, the Subdominant, and the Submediant, or sixth Note. The Mode of each of these accessory Keys is determined by its Mediant taken in the scale of the principal Key. For example, starting from a major Key *do* in order to modulate in its Mediant, one makes the Mode of this Mediant minor, since the Dominant *sol* of the principal Key produces a Minor Third on this Mediant *mi*. On the contrary, starting from a minor Key *la*, one modulates on its Mediant *do* in the major Mode, since the Dominant *mi* of the Key from which one starts produces a Major Third on the Tonic of that into which one enters, etc.

These rules, contained in a general formula, make it so that the Modes of the Dominant and of the Subdominant are similar to that of the Tonic, and that the Mediant and the sixth Note contain the opposed Mode. It must nevertheless be noted that in virtue of the right one has of passing from the major to the minor, and reciprocally, in the same Key, one can also change the order of the Mode from one Key to another; but in thus moving away from the natural *Modulation*, it is necessary to consider the return: for it is a general rule that every piece of Music should finish in the Key by which it began.

I have gathered together all the Keys into which one can immediately pass into two very short examples: the first, by beginning from the major Mode, and the other, by beginning from the minor Mode. Each Note indicates one *Modulation*, and the value of the Notes in each example also indicates the relative duration suitable to each of these modes according to its relationship with the principal Key. (See Plate B, Figures 6 and 7.)

These immediate *Modulations* furnish the means for passing into the most remote Keys by the same rules, and of returning afterward to the principal Key, which must never be lost from sight. But it is not enough to know the routes one must follow; one must also know how to enter into them. Here is the summary of the precepts which can be given on this Subject.

In the Melody it is necessary, in order to announce the *Modulation* one



Table of All the Immediate Modulations	
In leaving from the Major Mode	In leaving from the Minor Mode
	
Fig. 6	Fig. 7

Plate B, Figures 6 and 7

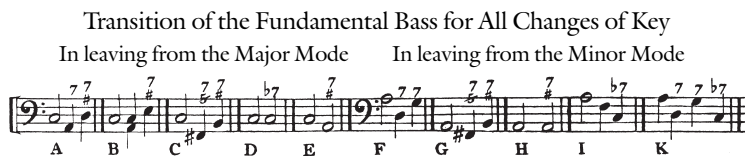


Plate B, Figure 8

has chosen, to make heard the alterations it produces in the Sounds of the Key from which one starts in order to make them suitable to the Key into which one is entering. Is one in *do* major? It is only necessary to sound a *fa*-Sharp in order to announce the Key of the Dominant, or a *si*-Flat in order to announce the Key of the Subdominant. Then run through the essential Pitches of the Key into which you are entering; if it is well chosen, your *Modulation* will always be good and regular.

In the Harmony there is a little more difficulty, for as the change in Key must be done at the same time in all the Parts, one should be careful about the Harmony and the Song in order to avoid following two different *Modulations* at the same time. Huygens has remarked quite correctly that the proscription of two consecutive Fifths has this rule for its basis;<sup>69</sup> in fact, one can hardly form several just Fifths in a row between two Parts without modulating in two different Keys.

In order to announce a Key, some claim that it suffices to form the Perfect Chord of its Tonic, and that this is indispensable in order to give the Mode; but it is certain that the Key can be well determined only by the Leading or Dominant Chord; it is therefore necessary to make this Chord heard when beginning the new *Modulation*. The good rule would be for the Seventh or minor Dissonance always be prepared by it, at least the first time one makes it heard; but this rule is not practicable in all the permissible *Modulations*, and provided that the Fundamental Bass progresses by consonant Intervals, that harmonic connection and the analogy of the Mode are observed, and that false Relations are avoided, the *Modulation* is always good. Composers give as another rule that of changing Key only after a Perfect Cadence; but this rule is useless, and no one submits himself to it.

All the possible ways of passing from one Key into another are reduced to five for the major mode and to four for the minor mode, which will be found set forth by a Fundamental Bass for each *Modulation* in Plate B, Figure 8. If there is another *Modulation* that is not reducible to one of these nine, unless this *Modulation* is not Enharmonic, it is infallibly bad. (See ENHARMONIC\* [*Enharmonique*].)



MORALS [*Moeurs*], *n. fem.* A considerable Part of the Music of the Greeks, called by them *Hermosmenos*, which consisted in knowing and choosing what is befitting in each Genre, and did not allow them to give to every feeling, to every object, to every character each form of which it was susceptible, but obliged them to limit themselves to what was suitable to the subject, to the occasion, to the persons, to the circumstances. *Morals* further consisted in so according and proportioning all the Parts of the Music, the Mode, the Tempo, the Rhythm, the Melody, and even the changes, in a Piece so that one might feel in the whole a certain conformity which did not leave any disparate element and which made it perfectly one. This sole Part, the idea of which is not even known in our Music, shows to what point of perfection an Art should be carried in which one has even reduced to rules what is decent, suitable, and befitting.

MUSICIAN [*Musicien*], *n. masc.* This name is equally given to the person who composes Music and to the person who performs it. The first is also called a COMPOSER\* [*Compositeur*]. See that word.

Ancient Musicians were Poets, Philosophers, Orators of the first order. Such were Orpheus, Terpander, Stesichorus, *etc.*<sup>70</sup> In addition, Boethius does not want to honor with the name of *Musician* the person who only practices Music by the servile ministration of the fingers and the voice, but the person who possesses this knowledge through reasoning and speculation.<sup>71</sup> And it seems, furthermore, that in order to raise oneself to the grand expressions of oratorical and imitative Music, one must have made a special study of the human passions and of the language of Nature. Nevertheless, the *Musicians* of our days—limited, for the most part, to the practice of Notes and of some phrasings of Song—will hardly be offended, I think, if they are not taken for great Philosophers.

MUSIC [*Musique*], *n. fem.* The Art of combining Sounds in a manner pleasant to the ear. This Art becomes a science, and even a very profound one, when one seeks to discover the principle of these combinations and the reasons for the affections they cause in us. Aristides Quintilianus defined *Music* as the Art of beauty and of propriety in Voices and in Motions.<sup>72</sup> It is not astonishing that, with definitions so vague and so general, the Ancients gave a prodigious scope to the Art they defined in this way.

It is commonly supposed that the word *Music* comes from *Musa*, since it is believed that the Muses invented this Art; but Kircher, following Diodorus,<sup>73</sup> has this noun come from an Egyptian word, claiming that it is in Egypt that Music began to be reestablished after the flood and that the first idea of it was taken from the Sound that the reeds which grow on

the banks of the Nile produced when the wind blew through their pipes. Whatever the etymology of the noun may be, the origin of the Art is certainly nearer to man, and if speech did not begin by Song, it is at least sure that there is singing everywhere there is speaking.<sup>74</sup>

*Music* is naturally divided into *theoretical* or *speculative Music* and *practical Music*.

Speculative *Music* is, if one can speak in this way, the knowledge of musical matter, that is, of the different relations—from low to high, from fast to slow, from sharp to sweet, from loud to soft—to which Sounds are susceptible, relations which, taking all the possible combinations of Music and of Sounds, seem thus to comprehend all the causes of the impressions their succession can make on the ear and on the soul.

Practical Music is the Art of applying and making use of the principles of the speculative part, that is, of directing and disposing the Sounds in relation to consonance, duration, succession, in such a way that the whole produces the proposed effect on the ear; it is this Art which is called COMPOSITION\* [*Composition*]. (See this word.) As regards the actual production of Sound by Voices or by Instruments, which is called *Performance*, this is the purely mechanical and operative part, which, assuming only the faculty of justly intoning the Intervals, of correctly marking the durations, of giving to the Sounds the degree prescribed in the Key and the value prescribed in the Beats, strictly speaking demands no other knowledge than that of the characteristics of *Music* and the habit of expressing them.

Speculative *Music* is divided into two parts: namely, the knowledge of the relation of Sounds or of their Intervals and that of their relative durations, that is, of the Meter and of the Beats.

The first is properly speaking what the Ancients called *harmonic Music*. It teaches what the nature of Song consists in and indicates what is consonant, dissonant, pleasant, or unpleasant in the Modulation. In a word, it makes known the various manners in which Sounds affect the ear by their timbre, by their volume, by their Intervals, which applies equally to their Accord and to their succession.

The second was called *Rhythmic* since it treats Sounds with regard to Beats and quantity. It contains the explanation of the *Rhythmos*, of the *Metron*, of long and short, lively and slow Meters, of Beats, and of the various parts into which they are divided in order to apply the succession of Sounds to them.

*Practical Music* is also divided into two Parts that correspond to the two preceding ones.

That which corresponds to *harmonic Music*, and which the Ancients called *Melopoeia*, contains the rules for combining and varying consonant

and dissonant Intervals in a pleasant and harmonious manner. (See MEL-  
OPOEIA [*Melopée*].)

The second, which corresponds to *Rhythmic Music*, and which they called *Rhythmopoeia*, contains the rules for the application of Beats, of Feet, of Meters, in a word, for the practice of Rhythm. (See RHYTHM [*Rhythme*].)

Porphyry gives<sup>75</sup> another division of *Music*, inasmuch as *Music* has for its object mute or sonorous Motion, and, without distinguishing it into speculative and practical, he finds in it the six following parts: *Rhythmiké*, for the movements of Dance; *Metriké*, for the Cadence and number of Verses; *Organiké*, for the practice of the Instruments; *Poëtiké*, for the Tones and the Accent of the Poetry; *Hypocritiké*, for the poses of the Pantomimes; and *Harmoniké*, for the Song.

*Music* is today divided more simply into *Melody* and *Harmony*, for Rhythmiké is no longer anything to us, and Metriké is of very little importance, seeing that, in Song, our Verses take their Meter almost uniquely from the *Music* and lose the little they have by themselves.

By the melody one directs the succession of the Sounds in a manner to produce pleasant Songs. (See MELODY\* [*Mélodie*], SONG\* [*Chant*], MOD-  
ULATION\* [*Modulation*].)

The Harmony consists in uniting to each of the Sounds of a regular succession two or more other Sounds which, simultaneously striking, the ear gratify it by their concurrence. (See HARMONY\* [*Harmonie*].)

One might and perhaps should further divide *Music* into *natural* and *imitative*. The first, limited to the physics of Sounds alone and acting only on the sense, does not at all convey its impressions to the heart, and can produce only more or less pleasant sensations. Such is the Music of Chansons, of Hymns, of Canticles, of all the Songs that are merely combinations of Melodious Sounds, and in general all Music that is merely Harmonious.

The second, by lively, accented, and, so to speak, speaking inflections, expresses every passion, paints every portrait, renders every object, submits all Nature to its learned imitations, and thus conveys to the heart of man the feelings appropriate for affecting it. This truly lyrical and theatrical Music was that of ancient Poems, and is in our days that which they endeavor to apply to Dramas which are performed in Song in our Theaters. It is only in this *Music*, and not in the Harmonic or natural one, that one must seek the reason for the prodigious effects that it produced in the past. As long as one seeks moral effects in the physics of Sounds alone, they will not be found and one will reason without understanding.

The ancient Writers differ greatly with one another over the nature, object, extent, and parts of *Music*. In general, they gave to this word a much

more extensive meaning than that which remains to it today. Not only did they comprehend Dance, Gesture, Poetry under the noun *Music*, as has just been seen, but even the collection of all the sciences. Hermes defined *Music* as the knowledge of the order of all things.<sup>76</sup> This was also the doctrine of Pythagoras' school and that of Plato, which taught that everything in the universe was *Music*. According to Hesychius, the Athenians gave to all their Arts the name *Music*<sup>77</sup>; and all this is no longer astonishing since a modern Musician has found the principle of all relations and the foundation of all the sciences in *Music*.<sup>78</sup>

From thence all the sublime *Musics* of which the Philosophers tell us: divine *Music*, the *Music* of men, celestial *Music*, terrestrial *Music*, active *Music*, contemplative *Music*, enunciative, intellective, oratorical *Music*, etc.

It is under these vast ideas that several passages of the ancients on *Music*, which are unintelligible in the sense which we give to the word today, must be understood.

It seems that *Music* was one of the first Arts: it is found mixed among the most ancient records of the Human Race. It is also quite likely that Vocal *Music* was discovered before Instrumental, if indeed there was ever among the Ancients a truly Instrumental *Music*, that is, composed uniquely for Instruments. Not only must men, before having discovered any Instrument, have made observations on the different Tones of their Voices, but they must have learned quite early to modify their voices and their windpipes in a pleasant and melodious manner from the natural concert of birds. After that, wind Instruments must have been the first to have been invented. Diodorus and other Authors attribute their invention to the observation of the whistling of the winds in reeds and other plant stalks.<sup>79</sup> This is also Lucretius' sentiment:

*At liquidas avium voces imitauer ore  
Ante fuit multò, quam levia carmina cantu  
Concelebrare homines possint, aureisque juvare;  
Et Zephyri cava per calamorum sibila primum  
Agrestis docuere cavas inflare cicutas.*<sup>80</sup>

Regarding other sorts of Instruments, sounding Strings are so common that men must have early observed their different Tones, which gave birth to Stringed Instruments. (See STRING [*Corde*].)

Instruments that are beaten in order to draw a Sound from them, as Drums and Timpani, owe their origin to the muted noise that hollow bodies produce when they are struck.

It is difficult to depart from these generalities in order to certify any fact about the invention of *Music* reduced to an Art. Without going back

before the flood, several Ancients attribute this invention to Mercury, as well as that of the Lyre. Others want the Greeks to be indebted for it to Cadmus, who, running away from the Court of the King of Phoenicia, brought into Greece the Musician Hermione, or Harmony, from which it would follow that this Art was known in Phoenicia before Cadmus. In one place in the Dialogue by Plutarch on *Music*, Lysias says that it is Amphion who invented it; in another, Soterichus says that it is Apollo; in still another he seems to give the honor to Olympus: there is hardly any agreement on all this, and this does not matter very much either. To these first inventors succeeded Chiron, Demodocus, Hermes, Orpheus, who, according to some, invented the lyre. After these came Phemius, then Terpander, a contemporary of Lycurgus who gave rules to *Music*. Some people attribute to him the invention of the first Modes. Finally Thaletas and Thamyris are added, who it is said was the inventor of instrumental *Music*.<sup>81</sup>

Most of these great Musicians lived before Homer. Others more modern are Lasus of Hermione, Melanippides, Philoxenus, Timotheus, Phrynnis, Epigonus, Lysander, Simicus, and Diodorus, who all considerably perfected *Music*.<sup>82</sup>

Lasus is, as is claimed, the first who wrote on this Art in the time of Darius Hystaspes. Epigonus invented the Instrument with forty Strings that bore his name. Simicus also invented an Instrument of thirty-five Strings, called a *Simicion*.<sup>83</sup>

Diodorus perfected the Flute and added new holes to it, and Timotheus the lyre, to which he added a new String, which caused him to be fined by the Lacedaemonians.<sup>84</sup>

As the ancient Authors speak quite obscurely about the inventors of *Musical* Instruments, they are also quite obscure about the Instruments themselves. We hardly know anything about them except their names. (See INSTRUMENT [*Instrument*].)

*Music* was held in the greatest esteem among the various Peoples of Antiquity, and principally among the Greeks, and this esteem was proportioned to the power and the surprising effects they attributed to this Art. Their Authors did not think they were giving too grand an idea of it by telling us that it was in use in Heaven and that it was the principal amusement of the Gods and of the souls of the Blessed. Plato had no fear of saying that no change could be made in *Music* that was not a change in the constitution of the State, and he claims that one can assign sounds that are capable of giving rise to the soul's servility, insolence, and the contrary virtues.<sup>85</sup> Aristotle, who seems to have written his politics only in order to oppose his sentiments to those of Plato, is nevertheless in accord with him regarding the power of *Music* on morals.<sup>86</sup> The judicious Polybius tells us

that *Music* was necessary to soften the morals of the Arcadians, who inhabited a country in which the air is dreary and cold; that those of Cy-naetha, who, neglecting *Music*, surpassed all the Greeks in cruelty and that there was no City in which there were so many crimes.<sup>87</sup> Athenaeus assures us that in the past all the divine and human laws, the exhortations to virtue, the knowledge of what concerned the Gods and Heroes, the lives and actions of illustrious men were written in verse and sung publicly by Choruses to the sound of Instruments; and we see by our sacred Books that such were, from the first times, the customs of the Israelites.<sup>88</sup> No more efficacious means has been found to carve the principles of Morality and the love of virtue into the minds of men; or, rather, all this was not the effect of a premeditated means, but of the grandeur of the sentiments and of the elevation of ideas which sought, by proportionate accents, to make a language worthy of them.

*Music* made up part of the study of the ancient Pythagoreans. They made use of it to rouse the heart to laudable actions and to take fire with love of virtue. According to these Philosophers, our soul was so to speak formed solely of Harmony, and by means of sensual Harmony they thought to reestablish the intellectual and primitive Harmony of the faculties of the soul, that is, that which according to them existed in it before it animated our bodies and when it inhabited the Heavens.

*Music* has today fallen from this degree of power and majesty to the point that we are made to doubt the truth of the marvels it once produced, although attested by the most judicious Historians and by the gravest Philosophers of Antiquity. Nevertheless, one finds in modern History some similar facts. If Timotheus aroused Alexander's fury by the Phrygian Mode and calmed it by the Lydian Mode, a more modern *Music* went still further by rousing, it is said, in Eric, King of Denmark, such a fury that he killed his best domestics.<sup>89</sup> These unfortunates were doubtless less sensitive to *Music* than their Prince, otherwise half the danger might have been his. D'Aubigné reports another story entirely similar to that of Timotheus. He says that, under Henri III, the Musician Claudin, playing at the wedding of the Duke of Joyeuse in the Phrygian Mode, animated, not the King, but a Courtier who forgot himself so far as to take up arms in the presence of his Sovereign; but the Musician hastened to calm him by taking the Hypophrygian Mode. This is said with as much assurance as if the Musician Claudin could have known in what exactly the Phrygian Mode and the Hypophrygian Mode consisted.

If our *Music* has little power over the affections of the soul, it is on the contrary capable of acting physically on the body. Witness the story of the Tarantula, too well known to speak of it here.<sup>90</sup> Witness that Gascon

Knight of whom Boyle speaks,<sup>91</sup> who could not retain his urine at the sound of Bagpipes, to which it must be added what this same Author recounts concerning those women who dissolved in tears when they heard a certain Tone by which the rest of the Listeners were not at all affected, and I know a woman of station in Paris who cannot listen to any *Music* without being seized with involuntary and convulsive laughter. One also reads in the History of the Academy of Sciences of Paris that a Musician was cured from a violent fever by a Concert played in his bedroom.

Sounds act even on inanimate bodies, as is seen by the trembling and resonance of one sounding body at the sound of another with which it is attuned in a certain ratio. Morhoff makes mention of a certain Petter, a Dutchman, who broke a glass at the sound of his voice.<sup>92</sup> Kircher speaks of a large rock which trembled at the sound of a certain Organ pipe.<sup>93</sup> Father Mersenne also speaks of a sort of tile which the Playing of an Organ broke as an earthquake might have done.<sup>94</sup> Boyle adds that stalls often tremble at the sound of Organs, that he has felt them tremble beneath his hand at the sound of the Organ or of the voice, and that he has been assured that those which were well made all tremble at some determinate Tone.<sup>95</sup> Everyone has heard of the famous pillar of a Church in Reims which rattled perceptibly at the sound of a certain bell whereas the other pillars remained immobile; but what robs the sound of the honor of being a marvel is that this same pillar rattled equally when the clapper of the bell was removed.

All these examples, the majority of which concern sound more than *Music*, and of which Physics can give some explanation, do not make any more intelligible or more believable the marvelous and almost divine effects which the Ancients attribute to *Music*. Several Authors have troubled themselves over trying to account for them. Wallis attributes them in part to the novelty of the Art and rejects them in part as the exaggeration of the Authors.<sup>96</sup> Others grant this honor only to Poetry. Others suppose that the Greeks, more sensitive than us by the constitution of their climate or by their manner of living, could have been moved by things that would not touch us at all. M. Burette, even while accepting all these facts, claims that they cannot at all prove the perfection of the *Music* which produced them; he sees nothing more to them than what miserable Village gut-scrapers might have produced, in his opinion, entirely as well as the foremost Musicians of the world.<sup>97</sup>

The majority of these sentiments are founded on the persuasion we have of the excellence of our *Music* and on the scorn we have for that of the Ancients. But is this scorn itself as well founded as we claim? This is what has been examined many times and which, given the obscurity of the matter and the insufficiency of the judges, is in great need of being better so.





and two Chansons of the American Savages taken from Father Mersenne.<sup>101</sup> A conformity of Modulation with our *Music* will be found in all these pieces which will possibly make some admire the goodness and universality of our rules, and for others will perhaps render suspect the intelligence or the fidelity of those who have transmitted these Tunes to us.

In the same Plate I have added the celebrated *Rans-des-vaches*, that Tune so cherished by the Swiss that they have forbidden it from being played in their Troops on pain of death, since it would cause those who heard it to dissolve in tears, desert, or die, so much would it arouse in them the ardent desire to see their country again. One would seek in vain in this Tune the energetic accents capable of producing such astonishing effects. These effects, which do not take place on foreigners, come solely from habit, from memories, from a thousand circumstances which, recounted by this Tune to those who hear it and recalling for them their country, their old pleasures, their youth, and all their ways of living, arouse in them a bitter pain for having lost all that. The *Music* therefore does not precisely act as *Music*, but as a memorative sign. This Tune, although always the same, today no longer produces the same effects it formerly produced on the Swiss, because, having lost the taste for their first simplicity, they no longer regret it when it is recalled for them. So true it is that it is not in their physical action that the greatest effects of Sounds on the human heart must be sought!

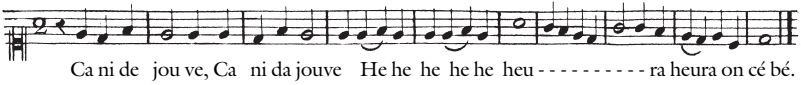
The manner in which the Ancients notated their *Music* was established on a very simple basis, which was the relationship of numerals, that is, by the letters of their Alphabet; but, instead of confining themselves in this idea to a small number of easily retained characters, they lost themselves among the multitudes of different signs with which they gratuitously muddled their *Music*, so that they had as many manners of notating as they did Genres and Modes. Boethius took those characters in the Latin alphabet corresponding to those of the Greeks.<sup>102</sup> Pope Gregory perfected his method.<sup>103</sup> In 1024, Guido of Arezzo, a Benedictine, introduced the use of Staves (see STAFF [*Portée*]), on the lines of which he marked the Notes in the form of Points (see NOTES [*Notes*]), designating by their position the elevation or lowering of the voice.<sup>104</sup> Kircher claims,<sup>105</sup> however, that this invention is anterior to Guido, and, in fact, I have not seen in this Monk's writings that he claims it for himself, but he did invent the Scale and applied to the Notes of his Hexachord the names derived from the Hymn of John the Baptist which are still preserved today. Finally, this man born for *Music* invented different instruments called *Polyplectra*, such as the Clavichord, the Spinette, the Vielle, *etc.* (See SCALE [*Gamme*].)

According to the common opinion, the characters of *Music* received

### Chinese Tune



### Chanson of Canadian Savages



### Canadian Dance



### Swiss Tune called the Rans des Vaches



### Persian Chanson



### TRANSLATION OF THE PERSIAN WORDS

Your complexion is vermilion like the flower of Granada,

Your speech a perfume whose inseparable friend I am;

There is nothing stable in the world, everything passes in it.

*Refrain:* Bring these scented flowers to revive the heart of my King.

their last considerable increase in 1330, the time at which, it is said, Jehan des Murs—improperly called by some *Jean de Meurs* or *de Muriâ*, a Doctor of Paris, although Gessner would make him English—invented the different forms of the Notes that designate their duration or quantity, and which we call today Whole Notes, Half Notes, Quarter Notes, etc. But this sentiment, although very common, appears to me poorly founded, judging from his Treatise of *Music*, entitled *Speculum Musicae*, which I had the courage to read almost in its entirety in order to confirm the invention attributed to this Author. Besides, like the King of the Poets, this great Musician had the honor of being claimed by various Peoples, for the Italians also claim he is of their Nation, apparently deceived by a fraud or an error by Bontempi, who says *Perugino* instead of *Parigino*.<sup>106</sup>

Lasus is, or appears to be, the first who wrote on *Music*, as was said above, but his work is lost, as are several other books of the Greeks and Romans on the same matter. Aristoxenus, a disciple of Aristotle and head of the sect in *Music*, is the most ancient Author who remains to us on this science. After him came Euclid of Alexandria. Aristides Quintilianus wrote after Cicero. Alypius came afterward, then Gaudentius, Nicomachus, and Baccheius.<sup>107</sup>

Marcus Meibomius has given us a fine edition of these seven Greek Authors with Latin translation and Notes.<sup>108</sup>

Plutarch wrote a Dialogue on *Music*. Ptolomy, the celebrated Mathematician, wrote the principles of Harmony, in Greek, around the time of the Emperor Antoninus. This Author occupies a middle position between the Pythagoreans and the Aristoxenians. Long afterward, Manuel Bryennius also wrote on the same subject.<sup>109</sup>

Among the Latins, Boethius wrote in the time of Theodoric, and not far from the same time as Martianus, Cassiodorus, and Saint Augustine.<sup>110</sup>

The Moderns are many in number. The best known are Zarlino, Salinas, Valgulio, Galileo, Mei, Doni, Kircher, Mersenne, Parran, Perrault, Wallis, Descartes, Holder, Mengoli, Malcolm, Burette, Vallotti, and finally M. Tartini, whose book is full of profundity, of genius, of overlong passages, and of obscurities, and M. Rameau, whose books have something singular about them in that they have made a great fortune without having been read by anyone. This reading has become superfluous anyway ever since M. d'Alembert took the trouble to explain to the Public the system of the Fundamental Bass, the only useful and intelligible thing found in the writings of this Musician.<sup>111</sup>

OPERA [*Opéra*], *n. masc.* A Dramatic and lyric Spectacle in which one endeavors to bring together all the charms of the fine Arts in the represen-

tation of a passionate action in order to arouse interest and illusion with the help of pleasant sensations.

The constituent parts of an *Opera* are: the Poem, the Music, and the Decoration. Through the Poetry one speaks to the mind, through the Music to the ear, through the Painting to the eyes, and the whole should bring them together in order to move the heart and convey to it the same impression simultaneously by the various organs. Of these three parts, my subject does not permit me to consider the first and the last except as they may relate to the second; thus, I pass immediately to that one.

The Art of combining Sounds pleasantly can be envisioned in two very different aspects. Considered as an institution of Nature, Music limits its effect to sensation and to the physical pleasure which results from the Melody, from the Harmony, and from the Rhythm. Such ordinarily is Church Music; such are dancing Tunes and those of Chansons. But taken as an essential part of the lyric Scene, whose principal object is imitation, Music becomes one of the fine Arts, capable of painting every Portrait, of arousing every feeling, of struggling with the Poetry, of giving it a new force, of embellishing it with new charms, and of triumphing over it by crowning it.

The Sounds of the speaking voice, being neither sustained nor Harmonic, are inappreciable and consequently cannot be allied in a pleasing way with those of the singing voice and of Instruments, at least in our Languages, too remote from any musical character. For the passages of the Greeks on their manner of doing recitation can be understood only by supposing their Language so accentuated that the inflections of the discourse in sustained declamation formed among themselves appreciable musical Intervals; thus, it can be said that their Theatrical Pieces were species of *Opera*, and it is for this same reason that there could have been among them no *Opera*, strictly speaking.

It is easy to perceive by the difficulty of uniting Song with discourse in our Languages that the intervention of the Music as an essential part must give to the lyric Poem a character different from that of Tragedy and of Comedy, and make of it a third type of Drama which has its specific rules; but these differences cannot be determined without an exact knowledge of the added part, of the means of uniting it to speech, and of its natural relations with the human heart—details which belong less to the Artist than to the Philosopher and which must be left to a pen made for illuminating all the Arts in order to show to those who profess them the principles of their rules and to men of taste the sources of their pleasures.

Limiting myself, then, to some observations on this subject that are more historical than reasoned, I shall first note that the Greeks did not

have a lyric genre in their Theater as we do, and that what they called by this name did not at all resemble ours. As they had a great deal of accent in their Language and little din in their Concerts, all their Poetry was musical and all their music declamatory, so that their Singing was almost merely a sustained discourse and so that they actually sang their verses, as they so announce at the head of their Poems, which, through imitation, gave to the Latins and then to us the ridiculous custom of saying *I sing* when one does not at all sing. As for what they called the lyric genre in particular, it was a heroic Poetry whose style was stately and ornamented, which was accompanied by the Lyre or Cithara in preference to any other Instrument. It is certain that Greek Tragedies were recited in a manner quite similar to Song, that they were accompanied by Instruments, and that Choruses had a part in them.

But if one holds for this reason that they were *Operas* similar to ours, it is therefore necessary to imagine *Operas* without Arias, for it seems to me to be proved that Greek Music, without excepting even the Instrumental, was merely a genuine Recitative. It is true that this Recitative, which brought together the charm of Musical Sounds with all the Harmony of Poetry and all the strength of declamation, must have had much more energy than modern Recitative, which can hardly manage one of these advantages except at the expense of the others. In our living Languages, which are for the most part affected by the severity of the climate in which they originated, the application of Music to speech is much less natural. An uncertain prosody accords poorly with regularity of the Meter; silent and indistinct syllables, harsh articulations, dull and less varied Sounds lend themselves with difficulty to Melody, and a Poetry cadenced uniquely by the number of syllables takes a Harmony that is little perceived in the musical Rhythm and is constantly opposed to the diversity of the values and of movements. These are the difficulties which had to be vanquished or eluded in the invention of lyric Poetry. They therefore tried to make an appropriate Language by the choice of words, of turns of phrase, of verses, and this Language, which was called lyric, was rich or poor in proportion to the sweetness or severity of the one from which it was derived.

Having in a way prepared speech for Music, it was then a question of applying the Music to the speech and of making it so appropriate for the lyric Scene that the whole could be taken for a single and identical idiom, which led to the necessity of always singing in order always to appear to be speaking—a necessity which increases due to a Language being little musical, for the less sweetness and accent a Language has, the more harsh and shocking the alternating transition from speech to Song and from Song to speech becomes for the ear. From whence the need to substitute a

discourse in Song for the discourse in recitation, which might imitate it so closely that it was only the justness of the Chords that distinguished it from speech. (See RECITATIVE [*Récitatif*].)

This manner of uniting Music to Poetry in the Theater which, among the Greeks, sufficed for interest and illusion because it was natural, by the contrary reason could not suffice among us for the same end. When listening to a hypothetical and constrained language, we have difficulty conceiving what is trying to be said to us; with a great deal of noise little emotion is produced in us: from this arises the necessity of bringing physical pleasure to the aid of the moral, and of making up for the energy of the expression with the attraction of the Harmony. Thus, the less one knows how to touch the heart, the more one must know how to flatter the ear, and we are forced to seek in sensation the pleasure which feeling denies us. This is the origin of Arias, of Choruses, of Instrumental parts, and of that enchantress Melody with which modern Music is often embellished at the expense of the Poetry, but which the man of taste rebuffs at the Theater when it flatters him without moving him.

At the birth of *Opera*, its inventors, wanting to avoid what was scarcely natural in the unison of Music with discourse in the imitation of human life,<sup>112</sup> took it into their heads to transport the Scene into the Heavens and into Hell, and, for want of knowing how to make men speak, they preferred to make Gods and Devils sing rather than Heroes and Shepherds. Soon magic and the marvelous became the foundations of the Lyric Theater, and, content with enriching themselves with a new genre, they did not even dream of inquiring whether that was the one they should have chosen. In order to sustain such a strong illusion they had to lavish everything human art could imagine that was more seductive amidst a People whose taste for pleasure and for the fine Arts reigned while vying with one another. That celebrated Nation which retained of its ancient grandeur only that of some ideas in the fine Arts, lavished its taste, its enlightenment in order to give to this Spectacle all the splendor it needed. Theaters in all of Italy were seen rising equal in size to the Palaces of Kings and in elegance to the monuments of Antiquity with which it was filled. The Arts of Perspective and Decoration were invented to ornament them. Artists of every sort vied with each other to make their talents shine. The most ingenious machines, the most daring flights, tempests, thunderbolts, lightning, and all the magic tricks of the wand were employed to fascinate the eyes while multitudes of Instruments and voices astonished the ears.

With all this the action always remained cold and every situation lacked interest. As there was no intrigue that wasn't easily resolved with the aid of some God, the Spectator, who was acquainted with the Poet's full powers,



calmly left to him the care of delivering his Heroes from the greatest dangers. Thus, the apparatus was immense and produced little effect, because the imitation was always imperfect and crude, because the action, taken beyond Nature, was without interest for us, and because the senses lend themselves poorly to illusion when the heart does not become involved in it, so that all in all it would have been difficult to bore an assembly at a greater price.

This Spectacle, as imperfect as it was, long filled its contemporaries—who knew no better one—with admiration. They even congratulated themselves on discovering such a beautiful genre. Here, they said, is a new principle joined to those of Aristotle; here admiration is joined to terror and to pity.<sup>113</sup> They did not see that this apparent richness was at bottom only a sign of sterility, like the flowers that cover the fields before the harvest. It was for want of knowing how to touch that they desired to surprise, and this pretended admiration was in effect only a puerile astonishment at which they should have blushed. A false air of magnificence, of extravagance, and of enchantment impressed them to the point that they spoke only with enthusiasm and with respect of a Theater which merited only boos. They had, with the best faith in the world, as much veneration for the scene itself as for the chimerical objects they tried to represent in it—as if there were more merit in making the King of the Gods speak as insipidly as the lowest of mortals, and as if Molière's Valets were not preferable to Pradon's Heroes!<sup>114</sup>

Although the Authors of these first *Operas* had hardly any other aim than that of dazzling eyes and dazing ears, it was difficult for the Musician never to be tempted to try to draw from his Art the expression of the feelings scattered through the Poem. The Songs of Nymphs, the Hymns of Preachers, the cries of Warriors, infernal howls did not so fill these crude Dramas that some moment of interest and situation was not found in which the Spectator asked only to be moved. Soon it began to be felt that, independently of the Musical declamation, the Language was oftentimes inappropriate, that the choice of the Movement, of the Harmony, and of the Songs was not indifferent to the things that were to be said, and that, consequently, the effect of the Music alone, limited until then to the sense, could be conveyed all the way to the heart. Melody, which at first was separated from Poetry only by necessity, took advantage of its independence to produce beauties that were absolutely and purely musical. Harmony, having been discovered or perfected, opened up for it new routes to please and to move. And Meter, emancipated from the constraint of poetic Rhythm, also acquired a sort of Cadence apart which it possessed of itself alone.

Music, having thus become a third Art of imitation, soon had its language, its expression, its portraits completely independent of the Poetry. The Instrumental part itself learned to speak without the help of words, and often feelings came from the Orchestra that were no less lively than those from the mouths of the Actors. It was then that, beginning to be disgusted by all the flashiness of the extravaganza, of the puerile din of the machines, and of the fantastic image of things which had never been seen, more interesting and truer portraits were sought in the imitation of Nature. Until then *Opera* had been constituted as it could be; for what better use could be made in the Theater of a Music that didn't know how to portray anything than to employ it for the representation of things that could not exist and of which no one was in a position to compare the image to the object? It is impossible to know whether one is affected by the portrayal of *merveilleux*<sup>115</sup> as one would be by their presence, whereas every man can judge for himself whether the Artist has learned well how to make the passions speak their language and whether the objects of Nature are well imitated. Also, as soon as Music had learned to portray and to speak, the charms of feeling soon caused those of the wand to be neglected, the Theater was purged of the jargon of Mythology, interest was substituted for *merveilleux*, the machines of the Poets and of the Carpenters were destroyed and lyric Drama took a more noble and less gigantic form. All that could move the heart was employed in it with success, there was no longer need to impress upon it with beings of reason or rather of folly, and the Gods were chased from the Stage when they learned how to represent men. This wiser and more regular form was further found to be the most suitable for illusion; it was felt that the Masterpiece of Music was to make itself forgotten, that by plunging the Spectator's soul into disorder and turmoil, it prevented the tender and pathetic Singing of a moaning Heroine from being distinguished from the true accents of distress, and that Achilles in fury could make our blood run cold with the same language that would be shocking to us from his mouth at any other time.

These observations gave rise to a second reform no less important than the first. It was felt that nothing cold and reasoned was needed for *Opera*, nothing which the Spectator could listen to tranquilly enough to reflect on the absurdity of what he was hearing, and it is above all in this that the essential distinction of lyrical Drama from simple Tragedy consists. All political deliberations, all conspiratorial plans, expositions, narrations, sententious maxims, in a word everything that speaks to reason alone was banished from the language of the heart, with witty phrases, Madrigals, and everything that was merely thoughts. The very tone of simple gallantry, which tallies poorly with the grand passions, was hardly admitted

into the padding of tragic situations, in which it almost always spoils the effect; for it is never more strongly felt that the Actor sings than when he speaks a Song.

The energy of every feeling, the violence of every passion are thus the principal object of lyric Drama, and the illusion that produces charm is always destroyed as soon as the Author and the Actor leave the Spectator to himself for an instant. Such are the principles on which modern *Opera* is established. Apostolo Zeno, the Corneille of Italy, his affectionate student, who is their Racine, opened up and perfected this new course.<sup>116</sup> They dared to put the Heroes of History into a Theater which seemed suited only to the phantoms of Fable. Cyrus, Caesar, Cato himself have appeared on the Stage with success, and the Spectators most repulsed at hearing such men sing soon forgot that they sang, subjugated and delighted by the brilliance of a Music as full of nobility and dignity as of enthusiasm and fire. One readily supposes that feelings so different from our own should also be expressed in another tone.

These new Poems, which genius had created, and which it alone could sustain, effortlessly pushed aside the bad Musicians who possessed only the mechanics of their Art and, deprived of the fire of invention and of the gift of imitation, made *Operas* as they would have made clogs. Scarcely were the cries of Bacchantes, conjurations of Sorcerers, and every Song which was merely vain noise banished from the Theater, scarcely were they tempted to substitute the accents of anger, of suffering, of menaces, of tenderness, of tears, of moaning, and all the movements of an agitated soul for this barbarous din than, forced to give feelings to Heroes and a language to the human heart, a Vinci, a Leo, a Pergolesi disdained the servile imitation of their predecessors and opened up a new course, went beyond it on the wing of Genius, and found themselves at their goal almost from their first steps.<sup>117</sup> But one cannot long walk in the path of good taste without rising or falling, and perfection is a point at which it is difficult to maintain oneself. After having tested and felt its forces, Music, in a position to walk alone, began to disdain the Poetry it should accompany and believed it would be better off drawing from itself the beauties it shared with its companion. It still proposed, it is true, to render the ideas and the feelings of the Poet, but it took on another language, after a fashion, and although the object was the same, the Poet and the Musician, too separated in their work, offered at the same time two similar, but distinct images which worked against one another. The mind, forced to divide itself, chose and remained fixed on one image rather than the other. Then the Musician, if he was more artful than the Poet, eclipsed him and caused him to be forgotten. The Actor, seeing that the Spectator sacrificed the words

to the Music, in his turn sacrificed gesture and theatrical action to the Song and to the brilliance of the voice, which caused the Piece to be completely forgotten and changed the Spectacle into a veritable Concert. If, on the contrary, the advantage is found on the side of the Poet, the Music in its turn becomes almost indifferent, and the Spectator, deceived by the noise, is thrown off the scent to the point of attributing the merit of an excellent Poet to a bad Musician, and of believing he is admiring masterpieces of Harmony while admiring well-composed Poems.

Such are the defects which the absolute perfection of Music and its faulty application to Language can introduce into *Opera* in proportion to the concurrence of these two causes. Concerning this it should be noted that the Languages most suited to yield to the laws of the Meter and of the Melody are those in which the doubleness of which I have just been speaking is least apparent, because, since Music lends itself solely to the ideas of the Poetry whereas the latter lends itself in its turn to the inflections of the Melody, and because when the Music ceases to observe the Rhythm, the Accent, and the Harmony of the verse, the verse bends and yields to the cadence of the Meter and to the musical accent. But when the Language has neither sweetness nor flexibility, the harshness of the Poetry prevents it from submitting to the Song, the very sweetness of the Melody prevents it from lending itself to the good recitation of the verse, and a perpetual constraint felt in the forced union of these two Arts shocks the ear and destroys at the same time the appeal of the Melody and the effect of the Declamation. This defect is without remedy, and to want to apply the Music with all one's force to a Language that is not musical is to give it more severity than it would otherwise have.

By what I have said up to this point, it can be seen that there is a closer relationship between the apparatus for the eyes, or the decoration, and the Music, or the apparatus for the ears, than there appeared to be between two senses that seem to have nothing in common, and that in certain regards *Opera*, constituted as it is, is not as monstrous a whole as it appears to be. We have seen that, wanting to offer to view the interest and the movements which the Music lacked, crude tricks of machines and flights were devised, and that until they learned how to move us they contented themselves with surprising us. It is therefore quite natural that music, having become passionate and pathetic, would have sent back those poor supplements which it no longer needed in its own to the Theaters of the Fairs.<sup>118</sup> Then *Opera*, purged of all that miraculousness which had debased it, became a Spectacle equally touching and majestic, worthy of pleasing people of taste and of interesting sensitive hearts.

It is certain that one might be able to omit the pomp of the Spectacle to

the same extent as one added to the interest of the action; for the more one is occupied with the characters the less one is occupied with the objects which surround them. But it is nonetheless necessary for the place of the Scene be suitable for the Actors who are made to speak in it, and the imitation of Nature, often more difficult and always more pleasant than that of imaginary beings, only becomes more interesting by becoming more plausible. A beautiful Palace, delightful Gardens, clever ruins please the eye still more than the fantastic image of Tartarus, of Olympus, of the Chariot of the Sun—an image all the more inferior to that which everyone can trace for himself, as with chimerical objects it costs the mind nothing to go beyond the possible and to make up models beyond any imitation. From this it follows that *merveilleux*, although out of place in Tragedy, are not so in the epic Poem, in which the imagination, always industrious and spendthrift, sees to the execution and draws from it a completely different component than the talent of the best Machinist and the munificence of the most powerful King could produce in our Theaters.

Although Music taken as an Art of imitation has an even closer relationship to Poetry than to Painting, the latter, in the manner in which it is employed in the Theater, is not, like Poetry, as subject to making a double representation of the same object with the Music, because the first renders the feelings of men and the other only the image of the place where they are found, an image which strengthens the illusion and transports the Spectator everywhere the Actor is assumed to be. But this transportation from one place to another must have rules and limits; in this regard it is permissible to take advantage of the agility of the imagination only while consulting the law of plausibility, and, although the Spectator seeks only to lend himself to the fictions from which he derives all his pleasure, his credulity must not be abused to the point of making him ashamed of it. In a word, one should consider that one is speaking to sensitive hearts without forgetting that one is speaking to reasonable people. It is not that I want to carry into the *Opera* that strict unity of place that is required in Tragedy and to which one can hardly subject oneself except at the expense of the action, so that one is accurate in some respect only in order to be absurd in a thousand others. Besides, this would be to deprive oneself of the advantage of changes of Scene, which mutually enhance one another: this would be to expose oneself, by a misguided uniformity, to ill-conceived oppositions between the Scene, which always remains, and situations that change; this the effect of the Music and that of the decoration would be mutually spoiled, like making voluptuous Instrumental pieces heard amongst rocks or gay tunes in the Palaces of Kings.

It is thus with reason that changes of Scene from Act to Act have been

allowed to remain, and in order for them to be regular and admissible it is enough that one could naturally be taken from the place from which one departed to the place to which one passes in the Interval of time which passes or which the action assumes between the two Acts, so that, as the unity of time should be contained within about twenty-four hours' duration, the unity of place should be contained within about the space of a day's journey. With regard to the changes of Scene sometimes practiced in a single Act, they seem to me likewise contrary to illusion and to reason, and should be absolutely proscribed from the Theater.

This is how the combination of Acoustics and Perspective can perfect the illusion, flatter the senses by diverse, but analogous impressions, and convey to the soul a single interest with a double pleasure. Thus, it would be a great error to think that the ordinance of the Theater has nothing in common with that of the Music, unless it is the general agreement they derive from the Poem. It is for the imagination of the two Artists to determine between themselves what that of the Poet leaves to their disposal, and to agree so well in this that the Spectator always feels the perfect accord of what he sees and what he hears. But it must be admitted that the Musician's task is the greater one. The imitation of painting is always cold, since it lacks that succession of ideas and of impressions which warms the soul by degrees, and since everything is said at the first glance. The imitative power of this Art, with so many apparent objects, is in fact limited to very weak representations. It is one of the great advantages of the Musician to be able to depict things that cannot be heard, while it is impossible for the Painter to depict those that cannot be seen, and the greatest marvel of an Art that acts only through movement is to be able to form it even into the image of rest. Sleep, the calm of the night, solitude, and silence itself enter into Music's portraits. Sometimes noise produces the effect of silence, and silence the effect of noise, as when a man falls asleep at an even and monotonous reading and wakes up the instant it stops, and it is the same for the other effects. But Art possesses more fertile and much finer substitutions than these; it knows how to arouse through one sense affections similar to those that can be aroused by another; and, as the relation is perceptible only insofar the impression is strong, painting, stripped of this power, gives to Music with difficulty the imitations that the latter draws from it. Let all of Nature be asleep, he who contemplates it sleeps not, and the Musician's art consists in substituting for the imperceptible image of the object that of the movements its presence arouses in the mind of the Spectator; it does not represent the thing directly, but awakens in our soul the same feeling experienced in seeing it.

Thus, although the Painter has nothing to draw from the Musician's

Score, the skillful Musician will not at all leave the Painter's studio without fruit. Not only will he agitate the sea as he likes, fan the flames of a blaze, make streams flow, rain fall, and torrents swell, but he will increase the horror of a frightful desert, darken the walls of an underground dungeon, calm a tempest, make the air tranquil, the Sky clear, and spread from the Orchestra a new freshness over the groves.<sup>119</sup>

We have just seen how the union of the three Arts which constitute the lyric Scene form amongst themselves a very well-connected whole. The attempt has been made to introduce a fourth one therein of which it remains for me to speak.

All the movements of the body organized according to certain laws in order to affect one's sight by some action take in general the name of gestures. Gesture is divided into two types, of which the first serves as an accompaniment to speech and the second as its supplement. The first, natural to every man who speaks, is differently modified according to men, Languages, and characters. The second is the Art of speaking to the eyes without the aid of writing through movements of the body which have become conventional signs. As this gesture is more difficult, less natural for us than the use of speech, and as it renders it useless, excludes it, and even assumes its deprivation, this is what called the Art of Pantomimes. Add to this Art a choice of agreeable poses and cadenced movements, and you will have what we call Dance, which hardly merits the name of Art when it says nothing to the mind.

This established, it is a matter of knowing whether Dance, being a language and consequently capable of being an Art of imitation, can enter with the other three into the course of the lyric action, or, indeed, whether it can interrupt and suspend this action without spoiling the effect and the unity of the Piece.

Now, I do not see how this last case could even raise any question. For everyone senses that the whole interest of a coherent action depends upon the continual and redoubled impression its representation makes on us, that all objects which suspend or divide attention are so many counter-attractions which destroy that of the interest, that by breaking up the Spectacle by other Spectacles foreign to it the principal subject is divided into independent parts which have nothing in common among them other than the general relation of the material which makes them up, and, finally, that the more pleasant the inserted Spectacles are the more deformed would be the mutilation of the whole. So that, by assuming an *Opera* broken up by whatever Divertimenti one can imagine, if they allow the principal subject to be forgotten, the Spectator will find himself at the end of each Festivity as little moved as at the outset of the Piece, and to



move him anew and to reanimate interest would be always to begin anew. This is why the Italians finally banished from the Entr'actes of their *Operas* those comic Intermezzi which were inserted into them—a sort of pleasant Spectacle, titillating and well-drawn from Nature, but so misplaced in the midst of a tragic action that the two Pieces mutually spoil one another and that one of the two could never be interesting except at the expense of the other.<sup>120</sup>

It therefore remains to see whether Dance, being unable to enter into the composition of the lyric genre as a foreign ornament, would be able to enter into it as a constituent part, and to make this Art cooperate with an action which it must not suspend. But how simultaneously to admit two languages which mutually exclude one another and to join the Art of Pantomime to the speech that renders it superfluous? The language of gesture, being the resource of mutes or of people who cannot make themselves heard, becomes ridiculous amongst those who speak. One does not at all respond to words with gamboling, nor to gesture with discourses, otherwise I do not at all see why someone who understands someone else's language does not respond to him in the same tone. Therefore suppress speech if you want to employ Dance: as soon as you introduce Pantomime into *Opera*, you should banish Poetry from it; because of all the unities, the most necessary is that of the language, and it is absurd and ridiculous to say the same thing at the time to the same person both orally and through writing.

The two reasons I have just put forward combine in all their force to banish from lyric Drama the Festivals and Divertimenti which not only suspend its action, but either say nothing or abruptly substitute for the language that is adopted another, opposed language whose contrast destroys plausibility, weakens interest, and, whether in the same continuous action or in an inserted episode, likewise offends reason. It would be much worse if these Festivals offered to the Spectator merely leaps without connection and Dances without object, a gothic and barbarous tissue in a sort of work in which everything should be painting and imitation.

It must nonetheless be admitted that Dance is so advantageously placed in the Theater that to remove it entirely would be to deprive it of one of its greatest pleasures. In addition, although one should not at all debase a tragic action by leaps and capers, the Spectacle is very pleasantly concluded when a Ballet is given after the *Opera*, as with a short piece after the Tragedy. In this new Spectacle, which does not depend at all upon the preceding one, the choice of another Language can also be made; it is another Nation which appears on the Stage. The Art of Pantomime or Dance then becoming the Language of convention, speech should in its turn be ban-

ished from it, and the Music, remaining the means of connection, is applied to the Dance in the short Piece as it was applied in the large one to the Poetry. But before employing this new Language, it must be created. To begin by giving Ballets in action without having first established the convention of the gestures is to speak a Language to people who do not have its Dictionary and who, consequently, will not at all understand it.

PREPARE [*Préparer*], *v. act.* *To Prepare* the Dissonance is to treat it in the Harmony in such a way that, thanks to what precedes it, it is less harsh to the ear than it would be without this precaution: according to this definition every Dissonance wants to be prepared. But when, in order *To Prepare* a Dissonance, one makes it a requirement for the Sound which forms it to have previously formed a consonance, then there is fundamentally only a single Dissonance which is *Prepared*, namely, the Seventh. Furthermore, this Preparation is not at all necessary in the Leading Chord, because then, since the Dissonance is characteristic both in the Chord and in the Mode, it is sufficiently announced, because the ear hears it, recognizes it, and is deceived neither about the Chord nor its natural progression. But when the Seventh is made to be heard on a fundamental Sound which is not essential to the Mode, it should be *Prepared* in order to prevent any equivocation, in order to prevent the ear of the listener from going astray, and, as this Seventh Chord is inverted and combined in several ways, there also arise various apparent ways of *Preparing* which, at bottom, nonetheless always come down to the same thing.

Three things must be considered in the use of Dissonances: namely, the Chord that precedes the Dissonance, the one in which it is found, and the one that follows it. The Preparation regards only the first two; as for the Third, see RESOLVING [*Sauver*].

When one wants *To Prepare* a Dissonance regularly, one must, in order to reach its Chord, choose such a progression of the Fundamental Bass that the Sound which forms the Dissonance is a prolongation of the strong Beat of a Consonance struck on the weak Beat in the preceding Chord: this is what is called *Syncopating*. (See SYNCOPATION [*Sincopé*].)

Two advantages result from this Preparation; namely: 1. That there is necessarily a harmonic connection between the two Chords since the Dissonance itself forms this connection; and, 2. That this Dissonance, being merely the prolongation of a consonant Sound, becomes much less harsh to the ear than it would be on a newly struck Sound. Now, this is all that is sought in Preparation. (See CADENCE [*Cadence*], DISSONANCE\* [*Dissonance*], HARMONY\* [*Harmonie*].)

It is seen by what I have just said that there is no Part specifically des-

tined *To Prepare* the Dissonance other than the very one that makes it heard, so that if the Treble sounds the Dissonance, it is for it to syncopate; but if the Dissonance is in the Bass, the Bass must syncopate. Although there is nothing in this that isn't very simple, the Masters of Composition have tremendously muddled all this.

There are Dissonances which are never *prepared*, such as the Added Sixth; others which are rarely *prepared*, such as the Diminished Seventh.

RECITATIVE [*Récitatif*], *n. masc.* Discourse recited in a musical and harmonious tone. It is a manner of Singing which very closely approaches speech, a declamation in Music in which the Musician should imitate, as far as possible, the inflections of the voice of the Declaimer. This Singing is called *Recitative* because it is applied to Narration, to recitation, and because it is used in dramatic Dialogue. It has been said in the Dictionary of the Academy that *Recitative* should be uttered distinctly;<sup>121</sup> there are *Recitatives* which should be uttered, others which should be sustained.

The perfection of *Recitative* very much depends on the character of the Language. The more accented and melodious the Language is, the more natural the *Recitative* is and the more it approaches true discourse; it is merely notated accent in a truly musical Language. But in a heavy, indistinct, and accentless Language, the *Recitative* is merely song, cries, Psalmody: speech is no longer recognized in it. Thus, the best *Recitative* is that in which one sings the least. This, it seems to me, is the sole true principle drawn from the nature of the thing, on which one should base oneself in order to judge *Recitative* and to compare that of one Language to that of another.

Among the Greeks all Poetry was in *Recitative* because, since the Language was melodious, it sufficed to add to it the Cadence of the Meter and sustained Recitation in order to make this Recitation altogether Musical. From thence it happens that those who versified it called it *singing*. This usage, having passed ridiculously into other Languages, still makes the Poets say, *I sing*, when they do not produce any sort of song. The Greeks could sing while speaking; but among us it is necessary to speak or to sing—both cannot be done at the same time. It is this very distinction that makes it so that we need *Recitative*. Music dominates too much in our Arias, Poetry is almost forgotten in them. Our Lyric Dramas are too much sung always to be so. An Opera that was simply a series of Arias would be almost as tiresome as a single Aria of the same extent. The Songs must be divided and separated by speech; but this speech must be modified by the Music. The ideas should change, but the Language should remain the same. Once given, to change this Language during the course of a Piece

would to be to want to speak part French, part German. The transition from discourse to Song, and reciprocally, is too disparate: it simultaneously offends both the ear and plausibility. Two interlocutors should speak or sing; they cannot do them both alternately. Now, the *Recitative* is the means of union between Song and speech: it is what separates and distinguishes the Arias; what rests the ear astonished by what preceded and disposes it to enjoy what follows; finally, it is by the aid of the *Recitative* that what is only dialogue, recital, narration in the Drama can be rendered without leaving the given Language and without displacing the eloquence of the Arias.

*Recitative* is not at all put into meter when singing. This Meter, which characterizes the Arias, would ruin recitative declamation. It is the Accent, whether grammatical or oratorical, that should alone direct the slowness or quickness of the Sounds, as well as their raising or their lowering. By notating the *Recitative* in some specific Meter, the Composer has in view only determining the correspondence of the Thoroughbass and of the Song, and indicating more or less how one should mark the quantity of the syllables, of cadencing and scanning the verses. The Italians never make use of anything but Meter in quadruple Time for their *Recitative*; but the French intermingle all sorts of Meters in theirs.

These latter also arm the Clef with all sorts of Transpositions, as much for the *Recitative* as for the Aria: this the Italians do not do, but they always notate the *Recitative* in natural. The quantity of modulations with which they burden it and the quickness of the Transitions, making it so that the Transposition suited to one Key is no longer suited to those into which one passes, would multiply the Accidentals on the same Notes too much and would make the *Recitative* almost impossible to follow and very difficult to notate.

In fact, it is in the *Recitative* that one should make use of the most studied harmonic Transitions and the most learned Modulations. The Arias, offering only one feeling, only one image, ultimately restricted to some unity of expression, barely allow the Composer to move away from the principal Key, and, if he wanted to modulate a great deal in such a short space, he would offer merely strangled, heaped up Phrases which would have neither connection, nor taste, nor Song. A very common defect in French Music, and even in German.

But in the *Recitative*, where expressions, feelings, ideas vary at every instant, equally varied Modulations should be employed which may represent by their contextures the successions expressed by the discourse of the Recitant. The inflections of the speaking Voice are not limited to musical Intervals; they are infinite and impossible to determine. Not being able to

fix them with a certain precision, therefore, the Musician, in order follow speech, should at least imitate them as much as possible, and, in order to convey to the mind of the Listeners the idea of the Intervals and of the Accents he cannot express in Notes, he has recourse to Transitions which assume them. If, for example, he needs the Interval from the major Semitone to the minor, he will not notate it—he would not know how to; but he will give you its idea with the help of an Enharmonic transition. A progression of the Bass often suffices to change all the ideas and to give the Accent and the inflection which the Actor cannot perform to the *Recitative*.

Moreover, since it is important for the Listener to be attentive to the *Recitative* and not to the Bass, which should produce its effect without being heard, it follows from this that the Bass should remain on the same Note as much as possible; for it is at the moment it changes Note and strikes another Pitch that it makes itself heard. These moments, being rare and well-chosen, do not at all use up great effects; they distract the Spectator less frequently and leave him more easily in the conviction that he hears only speaking, even though the Harmony acts continually on his ear. Nothing marks a poor *Recitative* more than those perpetually leaping Bases which run from Eighth Note to Eighth Note after the harmonic succession, and produce another sort of very flat and very tiresome Melody underneath the Melody of the Voice. The Composer should know how to prolong and vary his Chords on the same Bass Note, and to change it only at the moment when the inflection of the *Recitative*, becoming more lively, receives greater effect by this change of Bass and prevents the Listener from noticing it.

The *Recitative* should be used only to tie the contexture of the Drama, to separate and set off the Arias, to prevent the stupor which the continuation of the great noise would produce; but, as eloquent as the Dialogue may be, as energetic and learned as the *Recitative* may be, it should last only as long as is necessary for its object, because it is not at all through the *Recitative* that the Music's charm acts, and because it was however only in order to display this charm that the Opera was instituted. Now, it is in this that the error of the Italians lies, they who, by the extreme length of their scenes, make poor use of the *Recitative*. However beautiful it may be in itself, it grows tiresome because it lasts too long and because it is not in order to hear the *Recitative* that one goes to the Opera. Demosthenes speaking all day would grow tiresome in the end, but it does not thereby follow that Demosthenes was a tiresome Orator. Those who say that the Italians themselves find their *Recitative* poor speak quite gratuitously since, on the contrary, there is no other part of Music of which the Connoisseurs make so much and concerning which they are also difficult to

please. It even suffices to excel in this part alone, being mediocre in all the others, to raise oneself to the rank of the most illustrious Artists, and the celebrated *Porpora*<sup>122</sup> was immortalized solely on this account.

I add that although the same energy of expression is not commonly sought in the *Recitative* as in the Arias, it is nonetheless sometimes found there, and when it is found there it produces a greater effect than in the Arias themselves. There are few good Operas in which some principal piece of *Recitative* arouses the admiration of Connoisseurs and their interest in the whole Spectacle; the effect of these pieces sufficiently shows that the defect imputed to the genre is solely in the manner of treating it.

M. Tartini relates having heard in 1714 at the Opera at Ancona a piece of *Recitative* of a single line, and without any Accompaniment other than the Bass, produce a prodigious effect, not only on the Professors of the Art, but on all the Spectators. "It was," he says, "at the beginning of the third Act. At each presentation a profound silence in the whole Theater announced the approach of this astounding piece. Faces were seen to grow pale; one felt oneself trembling, and everyone looked at one another with a sort of fright: for there weren't either tears or complaints; it was a certain feeling of bitter and contemptuous severity which troubled the soul, gripped the heart, and chilled the blood." The original passage must be transcribed; these effects are so little known in our Theaters that our Language is little practiced in expressing them.

*L'anno quattordicesimo del secolo presente nel Dramma che si rapresentava in Ancona, v'era su'l principio dell' Atto terzo una riga di Recitativo non accompagnato da altri stromenti che dal Basso; per cui, tanto in noi professori, quanto negli ascoltanti, si destava una tal e tanta commozione di animo, che tutti si guardavano in faccia l'un l'altro, per la evidente mutazione di colore che si faceva la ciascheduno di noi. L'effetto non era di pianto (mi ricordo benissimo che le parole erano di sdegno) ma di un certo rigore e freddo nel sangue, che di fatto turbava l'animo. Tredici volte si recitò il Dramma, e sempre seguì l'effetto stesso universalmente; di che era segno palpabile il sommo previo silenzio, con cui l'Uditorio tutto si apparecchiava à goderne l'effetto.*<sup>123</sup>

SOUND [Son], *n. masc.* When the agitation communicated to the air by the collision of one body struck by another reaches the auditory organ, it produces a sensation there called *Noise*. (See NOISE [Bruit].) But there is a resonant and discernible Noise called *Sound*. Research concerning absolute *Sound* belongs to the Physicist. The Musician examines only relative *Sound*; he examines it only by its perceptible modifications; and it is only according to this last idea that we are viewing it in this Article.

There are three principal objects to consider in *Sound*: the Tone, the strength, and the timbre. Under each of these relationships, *Sound* is

considered as modifiable: 1st, from low to high; 2nd, from loud to soft; 3rd, from sharp to mild, or from muted to striking, and reciprocally.

I first assume that, whatever the nature of *Sound* might be, its vehicle is nothing other than the air itself; first, because the air is the only intermediary body whose existence one is perfectly assured of between the sounding body and the auditory organ; because beings must not be multiplied unnecessarily; because the air suffices to explain the formation of *Sound*; and, furthermore, because experimentation teaches us that a sounding body does not render *Sound* in a place totally deprived of air. If one wants to imagine another fluid, one can easily apply to it everything that I say about air in this Article.

The resonance of *Sound*, or, to speak more precisely, its permanence and its prolongation, can arise only from the duration of the agitation of the air. As long as this agitation lasts, the air struck comes constantly to strike the auditory organ and thus prolongs the sensation of the *Sound*. But there is no simpler way at all to conceive of this duration than to assume vibrations in the air which succeed one another, and which thus renew the impression at each instant. Furthermore, this agitation of the air, of whatever type it may be, can be produced only by a similar agitation in the parts of the sounding body; now, it is a certain fact that the parts of the sounding body experience such vibrations. If one touches the body of a Cello while a *Sound* is being drawn from it, one feels it vibrate under one's hand and one sees quite perceptibly the vibrations of the String last until the *Sound* is extinguished. It is likewise with a bell that has been sounded by striking its clapper; one feels it, one even sees it vibrate, and one sees grains of sand thrown on its surface jump about. If the String is slackened, or if the Bell is cracked, the more vibration, the more *Sound*. If, then, this bell or this String can communicate to the air only the motions it itself has, it cannot be doubted that the *Sound* produced by the vibrations of the sounding body is propagated by vibrations similar to those this body communicates to the air.

All this assumed, let us first examine what constitutes the relationship of *Sounds* from low to high.

I. Theon of Smyrna says that Lasus of Hermione, as well as the Pythagorean Hipassus of Metapontum, made use of two similar vases which resonated in Unison in order to calculate the ratio of Consonances; that, leaving one of the two empty, and filling the other to a quarter full, striking them both caused the Consonance of the Fourth to be heard; that, further filling the second to a third full, then to half full, striking them both produced the Consonance of the Fifth, then of the Octave.<sup>124</sup>

Pythagoras, according to Nicomachus' and Censorin's report,<sup>125</sup> took



another route for calculating the same ratios. He suspended different weights from the same sounding Strings, they say, and determined the ratios of the various *Sounds* by those he found between the hanging weights; but Pythagoras' calculations are too exact to have been made in this way, since everyone today knows, from Vincenzo Galilei's experiments,<sup>126</sup> that *Sounds* are to one another not as the hanging weights, but by the double inverse ratio of these same weights.

Finally, the Monocord was invented, called by the Ancients a *Canon harmonicus*, because it gave the ordering of the harmonic divisions. Its principle must be explained.

Two Strings of the same metal, equal and equally hung, form a Unison that is perfect in every sense: if the lengths are unequal, the shorter one will give a higher *Sound*, and therefore have more vibrations in a given time; from which it is concluded that the difference of *Sounds* from low to high proceeds only from that of the vibrations made in a certain space of time by the Strings or sounding bodies which cause them to be heard. Thus, the ratios of the *Sounds* are expressed by the number of vibrations they produce.

It is further known, by experiments no less certain, that, everything else being equal, the vibrations of Strings are always reciprocal to their lengths. Thus, a String double the length of another will have only half the number of vibrations in the same time as this one, and the ratio of the *Sounds* they cause to be heard is called an *Octave*. If the Strings are as 3 and 2, the vibrations will be as 2 and 3, and the ratio of the *Sounds* will be called a *Fifth*; etc. (See INTERVAL\* [*Intervalle*].)

It is seen by this that with moveable Bridges it is easy to form on a single string divisions which produce *Sounds* in all the possible ratios, whether between themselves or with the entire String. This is the Monocord of which I was just speaking. (See MONOCORD [*Monocorde*].)

Sounds can be made high or low by other means. Two Strings of equal lengths do not always form a Unison; for if one is thicker or less taut than the other, it will make fewer vibrations in an equal time, and consequently will produce a lower *Sound*. (See STRING [*Corde*].)

By means of these principles it is easy to explain the construction of Stringed Instruments, such as the Harpsichord, the Dulcimer, and the playing of Violins and Basses, which, by different shortenings of the Strings under the fingers or mobile bridges, produce the diversity of *Sounds* which are drawn from these Instruments. One must reason in the same way for wind Instruments: the longer ones form lower *Sounds*, if the wind is the equal. The holes, as on Flutes and Oboes, serve to shorten them in order to produce higher *Sounds*. By producing more wind one

makes them go to the octave, and the *Sounds* become still higher. The column of air then forms a sounding body, and the various Tones of the Trumpet and of the Hunting Horn have the same principles as the harmonic *Sounds* of the Cello and of the Violin, etc. (See SOUNDS, HARMONIC [*Sons, Harmonique*].)

If one of the large Strings of a Violin or of a Cello is made to resonate with a certain amount of force by passing the bow a bit closer to the bridge than ordinarily, as little trained and attentive one's ear may be, aside from the *Sound* of the entire String, one will distinctly hear at least that of its Octave, that of the Octave of its Fifth, and that of the double-Octave of its Third: one will likewise see vibrate and will hear resonate all the Strings raised to the Unison of these *Sounds*. These accessory *Sounds* always accompany any principal *Sound* whatsoever, but when this principal *Sound* is high, the others are less perceptible. These are called the Harmonics of the principal *Sound*: it is by these, according to M. Rameau,<sup>127</sup> that every *Sound* is discernible, and it is in them that he and M. Tartini have sought the principle of all Harmony, but by completely opposite routes. (See HARMONY\* [*Harmonie*], SYSTEM [*Système*].)

One difficulty which remains to be explained in the theory of *Sound* is that of knowing how two or more *Sounds* can be made to be heard at the same time. For example, when one hears the two *Sounds* of the Fifth, of which the first makes two vibrations while the other makes three of them, it is not very easily understood how the same mass of air can simultaneously furnish these different numbers of vibrations, which are distinct from one another, and still less so when more than two *Sounds* are produced together and when they are all dissonant with one another. Mengoli and others deal with it by comparisons.<sup>128</sup> It is, they say, as with two rocks one throws into the water at the same time, and whose different circles cross one another without becoming confounded. M. de Mairan gives a more philosophic explanation.<sup>129</sup> According to him, the air is divided into particles of various sizes, each of which is capable of one particular Tone and is not susceptible of any other, so that to each *Sound* formed, the particles of air analogous to it are alone struck, they and their Harmonics, while all the others remain tranquil until they are moved in their turn by the *Sounds* that correspond to them; so that one hears two *Sounds* at the same time as one sees two colors at the same time, because, being produced by different parts, they affect the organ at different points.

This system is ingenious, but the imagination lends itself with difficulty to the infinity of particles of air different in size and in motion which must be spread through each point of space in order always to be ready, as needed, to everywhere render the infinity of all possible *Sounds*. When

they have once reached the tympanum of the ear, it is still less conceivable how, several of them striking it together, they can produce in it a vibration capable of transmitting to the brain the sensation of each in particular. It seems that the difficulty has been put further off rather than resolved. The example of light, whose rays cross one another at a single point without confounding the objects, is alleged in vain: for, aside from the fact that one difficulty is not resolved by another, the parity is not exact, since the object is seen without exciting in the air a movement similar to that which the sounding body must excite in order to be heard. Mengoli seemed to want to anticipate this objection by saying that the masses of the air charged, so to speak, with different *Sounds* strike the tympanum only successively, alternately, and each in its turn, without considering too carefully what would occupy those which are obliged to wait for the first ones to have achieved their task, or without explaining how the ear, struck with so many successive blows, can distinguish those which belong to each *Sound*.

With regard to the Harmonics which accompany any *Sound* whatsoever, they offer less a new difficulty than a new case of the preceding one; for as soon as one should explain how several *Sounds* can be heard at the same time, one will easily explain the phenomenon of Harmonics. Indeed, let us assume a *Sound* putting into motion the particles of air susceptible of the same *Sound*, and the particles susceptible of the higher *Sounds* all the way to infinity; of these various particles, there will be some, whose vibrations beginning and ending precisely with those of the sounding body, will be constantly aided and renewed by it; these particles will be those which will produce the unison. Then comes the Octave, whose two vibrations are in accord with one of the principal *Sound*'s, are aided and reinforced by it only every other one; consequently the octave will be perceptible, but less than the Unison. Then comes the Twelfth or the Octave of the Fifth, which makes precisely three vibrations while the fundamental *Sound* makes one of them; thus, receiving a new blow only at every third vibration, the Twelfth will be less perceptible than the Octave, which receives this new blow as soon as the second one. By following this same gradation, one finds the concurrence of the vibrations later, the blows less often renewed, and consequently the Harmonics always less perceptible, until the ratios are made complex to the point that the idea of the too rare concurrence is effaced, and the vibrations, having the time to be extinguished before being renewed, the Harmonic is no longer heard at all. Finally, when the ratio ceases to be rational, the vibrations never concur; those of the highest *Sounds*, always contrary, are soon stifled by those of the String, and this high *Sound* is absolutely dissonant and null. Such is the reason why the first Harmonics are heard and why all the other *Sounds* are

not heard. But this is already too much concerning the first quality of *Sound*; let us pass on to the other two.

II. The strength of the *Sound* depends upon that of the vibrations of the sounding body: the larger and stronger the vibrations are, the stronger and more vigorous the *Sound* is and the better it is heard from afar. When the String is taut enough, and when the voice or the Instrument is not forced too much, the vibrations always remain isochronic, and, consequently, the Tone remains the same, whether one increases or weakens the *Sound*; but by bowing too strongly, by slackening the String too much, by blowing out or shouting too much, one can make the vibrations lose the isochronism necessary for the identity of the Tone; and this is one of the reasons why in French Music, in which the first merit is to shout well, one is more subject to singing falsely than in Italian, where the Voice is moderated with more mildness.

The speed of the *Sound*, which would seem to depend upon its strength, does not at all depend upon it. This speed is always equal and constant if it is not accelerated or retarded by the wind: that is, the *Sound*, loud or soft, always extends uniformly, and it always covers twice the distance in two seconds that it did in one. According to Halley's and Flamstead's report, in England *Sound* covers 1070 French feet in one second, and 174 toise in Peru, according to M. de La Condamine. Father Mersenne and Gassendi have maintained that favorable or contrary wind would neither accelerate nor retard the *Sound*; this has passed for an error ever since the experiments Derham and the Academy of Sciences have made concerning this subject.<sup>130</sup>

Without slowing its progress, *Sound* grows weaker as it extends, and this weakening—if the propagation is free, if it is not impeded by any obstacle or slowed by the wind—usually proceeds at the ratio of the square of the distances.

III. As for the further difference found between *Sounds* by the quality of their Timbre, it is obvious that it depends neither upon the degree of elevation, nor even upon that of loudness. An Oboe can well be put into Unison with a Flute, it can well soften its *Sound* to the same degree; the *Sound* of the Flute will always have an indefinable mellowness and sweetness; that of the Oboe will have an indefinable coarseness and sharpness which will prevent the ear from confusing them, without speaking of the variety of the Timbre of Voices (See VOICE\* [*Voix*]). There is no Instrument that does not have its own particular one, which is not at all that of another, and the Organ alone has twenty stops all of a different Timbre. Nevertheless, no one I know of has examined *Sound* in this aspect, which, just as the others, is perhaps found to have its difficulties: for the quality of

the Timbre can depend upon neither the number of vibrations, which produces the degree from low to high, nor the size or the strength of these same vibrations, which produces the degree of loud and soft. One will therefore have to find a third cause in the sounding body different from these two in order to explain this third quality of *Sound* and its differences—which, perhaps, is not too easy to do.

The three principal qualities of which I have just been speaking all enter into the object of Music, although in different degrees, which is *Sound* in general.

In actuality, the Composer does not only consider whether the *Sounds* he employs should be treble or bass, low or high, but whether they should be loud or soft, sharp or mild, muted or striking, and he distributes them to the different Instruments, to the different Voices, in Recitation or in Choruses, to the extremities or in the *Middle* of the Instruments or of the Voices, with *Pianos* or *Fortes*, according to the conventions for all these.

But it is true that it is uniquely in the comparison of *Sounds* from low to high that the whole Harmonic science consists: so that, as the number of *Sounds* is infinite, one can say in the same sense that this science is infinite in its object. The limits of the extent of *Sounds* from low to high is not known at all, and as small as the Interval between two *Sounds* may be, it will always be conceived as divisible by a third *Sound*; but nature and art have limited this infinity in the practice of Music. One soon finds the limits of practicable *Sounds* in the Instruments, on the low as well as the high end. Elongate or shorten a sounding String to a certain point and it will no longer have a *Sound*. Nor can one increase or diminish at will either the capacity of a Flute or of an Organ pipe, or its length; there are limits past which neither one will resonate any longer. The blowing also has its measure and its laws. Too weak, it no longer produces a *Sound*; too strong, it produces only a piercing shout that is impossible to discern. Finally, it is confirmed by a thousand experiments that every perceptible *Sound* is contained in a certain latitude, past which—either too low or too high—it is no longer discernible or becomes indiscernible to the ear. M. Euler has even fixed its limits after a fashion, and according to his observations, reported by M. Diderot in his “Principles of Acoustics,” every perceptible *Sound* is contained between the numbers 30 and 7552: that is, according to this great Geometer, the lowest *Sound* discernible to our ear makes thirty vibrations per second, and the highest 7552 vibrations in the same time—an Interval which contains about eight Octaves.<sup>131</sup>

From another point of view, it is seen by the harmonic generation of *Sounds* that in their potential infinity there is only a very small number of them that can be accepted into the harmonic system. For all those which

do not form Consonances with fundamental *Sounds*, or which do not arise mediately or immediately from the differences of these Consonances, should be proscribed from the system. This is why, as perfect as our own is assumed to be today, it is nonetheless limited to but twelve *Sounds* in the range of one Octave, all the other Octaves containing merely replicas of these twelve. If one wants to count all these replicas for as many different *Sounds*, multiplying them by the number of Octaves to which the range of perceptible *Sounds* is limited, one will find ninety-six in all for the largest number of *Sounds* practicable in our Music on a single fundamental *Sound*.

The number of *Sounds* practicable in ancient Music could not be estimated with the same precision. For the Greeks formed, so to speak, as many systems of Music as they had different ways of tuning their Tetrachords. It appears from reading their Musical treatises that the number of these ways was large and perhaps indeterminate. Now, each particular Chord changed the *Sounds* of half the system, that is, the two mobile Pitches of each Tetrachord. Thus, one sees quite clearly what *Sounds* they had in a single manner of Tuning; but one can not calculate precisely how much in all this number multiplied the changes of Genre and of Mode which introduced new *Sounds*.

With regard to their Tetrachords, they divided *Sounds* into two general classes: namely, stable and fixed *Sounds* whose Accord never changed, and mobile *Sounds* whose Accord changed with the type of Genre. The first were eight in all, namely, the two extremes of each Tetrachord and the Proslambanomenos String; the second were also at the very least eight in number, sometimes nine or ten, since the two neighboring *Sounds* were sometimes merged into one and sometimes separated.

In tight Genres, they further divided stable *Sounds* into two types, the first of which contained three *Sounds* called *Apyncnoi*, or *non-tight*, since they formed neither Semitones nor small Intervals on the bass; the three *Apyncnoi Sounds* were the Proslambanomenos, the Nete Synemenon, and the Nete Hyperbolaeon. The other type carried the name of *Barypyncnoi Sounds*, or *sub-tight*, since they formed the low end of the small Intervals; *Barypyncnoi Sounds* were five in number: namely, the Hypate Hypaton, the Hypate Mese, the Mese, the Parameson, and the Nete Diezeugmenon.

Mobile *Sounds* were similarly subdivided into *Mesopyncnoi Sounds*, or middling in tightness, which were also five in number, namely, the second in ascending from each Tetrachord; and by five other *Sounds* called *Oxypyncnoi*, or extremely-high, which were the third in ascending from each Tetrachord. (See TETRACHORD [*Tétracorde*].)

With regard to the twelve *Sounds* of the modern system, their Accord never changes and they are all immobile. Brossard claims<sup>132</sup> that they are



all mobile, based on the fact that they can be altered by a Sharp or by a Flat; but it is one thing to change Pitch and another thing to change the Tuning of a String.

SUBJECT [*Sujet*], *n. masc.* A term of composition: it is the principal part of the Design, the idea which serves as the foundation for the others. (See DESIGN [*Dessein*].) All the other parts require only art and labor; this one alone depends upon genius, and it is in it that invention consists. The principal *Subject* in Music produce Rondos, Imitations, Fugues, etc. See these words. A sterile and cold Composer, after having with difficulty found some meager *Subject*, merely makes it return, and parades it from Modulation to Modulation; but the Artist who has warmth and imagination knows, without letting his *Subject* be forgotten, to give it a new aspect<sup>133</sup> every time he represents it.

TEMPERAMENT [*Tempérament*], An operation by which, through a slight alteration in the Intervals, making the difference between two neighboring Sounds vanish, they are combined into one, which, without shocking the ear, forms Intervals with respect to the others. By this operation, the Scale is simplified by diminishing the number of Sounds necessary. Without *Temperament*, instead of the twelve Sounds alone which the Octave contains, more than sixteen of them would be necessary in order to modulate in all the Keys.

On the Organ, on the Harpsichord, on every other Keyboard Instrument, there is not, and one can scarcely have, any Interval in perfect Accord other than the Octave alone. The reason for this is that since three Major Thirds or four Minor Thirds come to make up a just Octave, the latter surpass it and the former do not reach it. For  $5/4 \times 5/4 \times 5/4 = 125/64 < 128/64 = 2/1$ ; and  $6/5 \times 6/5 \times 6/5 \times 6/5 = 1296/625 < 1296/628 = 2/1$ . Thus, one is constrained to widen the Major Thirds and to shorten the minor ones so that the Octaves and all the other Intervals correspond exactly, and so that the same keys on the keyboard may be employed under their various relationships. In a moment I shall say how this is done.

This necessity did not make itself felt all of a sudden; it was recognized only while perfecting the musical system. Pythagoras, who was the first to discover the ratios of harmonic Intervals, claimed that these ratios were observed in all mathematical strictness, without according anything to the tolerance of the ear. This severity might have been good for his time, when the whole range of the system was still limited to a very small number of Strings.<sup>134</sup> But as the majority of the Ancients' Instruments were made up of Strings that were played unaltered, and which consequently had one



String for each Sound, they saw that, in proportion as the system expanded, by multiplying the Strings too much, Pythagoras' rule prevented the appropriate uses from being drawn from them.

Aristoxenus, Aristotle's disciple, seeing how much the precision of calculations harmed the progress of Music and the ease of performance, suddenly took the opposite extreme; almost entirely abandoning calculation, he gave himself over to the judgment of the ear alone, and rejected as useless everything Pythagoras had established.

This formed two sects in Music that divided the Greeks for a long time, the one of the Aristoxenians, who were practicing Musicians, the other of the Pythagoreans, who were Philosophers. (See ARISTOXENIANS [*Aristoxénniens*] and PYTHAGOREANS [*Pythagoriciens*].)

Later on, Ptolemy and Didymus,<sup>135</sup> finding with reason that Pythagoras and Aristoxenus had gone into two equally vicious extremes, and simultaneously consulting the senses and reason, each worked in his own way to reform the ancient diatonic system. But as they did not depart from the established principles for the division of the Tetrachord, and as they finally recognized the difference between the major *Tonos* and the minor *Tonos*, they did not dare touch the latter in order to apportion it, like the other, into two reputedly equal Parts by a chromatic Pitch; the system remained still long afterward in a state of imperfection which did not allow the true principle of *Temperament* to be perceived.

Finally came Guido of Arezzo,<sup>136</sup> who in a certain way recast Music and who, it is said, invented the Clavier. Now, it is certain that this Instrument, or the Organ, could have existed only at the same time that *temperament* was discovered, without which it is impossible to tune them, and it is at least impossible for the first invention to have long preceded the second; this is almost everything we know about it.

But although the necessity of *Temperament* was long known, the same is not the case for the best rule to follow in order to determine it. The last century, which was the century of discoveries of every kind, is the first which gave us very clear knowledge concerning this matter. Father Mersenne and M. Loulié made calculations; M. Sauveur found the divisions that furnish every possible *Temperament*; finally, M. Rameau, after all the others, believed he was the first to develop the genuine theory of *Temperament*, and himself claimed, by this theory, to establish as new a very ancient practice of which I shall speak in a moment.<sup>137</sup>

I have said that in order to temper the Sounds of the Harpsichord it was a matter of widening the Major Thirds and of shortening the minor ones, and of distributing these alterations in such a way as to make them as little perceptible as possible. For this, it is necessary to allocate the Tun-

ing of the Instrument, and this Tuning is ordinarily done by means of Fifths; it is therefore by its effect on these Fifths that we have to consider *Temperament*.

If four consecutive Fifths, such as *do sol re la mi*, are tuned quite justly, one will find that this fourth Fifth *mi* will make a Major Third with the *do* from which it has started that is discordant and much too wide; and in fact this *mi*, produced as the Fifth of *la*, is not the same Sound which the Major Third of *do* should make. Here is the proof.

The ratio of the Fifth is  $\frac{2}{3}$  or  $\frac{1}{3}$ , due to the Octaves 1 and 2 taken indifferently for one another. Thus, the series of Fifths forming a triple progression, will give *do* 1, *sol* 3, *re* 9, *la* 27, *mi* 81.

Let us at present consider this *mi* as the Major Third of *do*; its ratio is  $\frac{4}{5}$  or  $\frac{1}{5}$ , 4 being merely the double Octave of 1. If from Octave to Octave we draw near this *mi* of the preceding one, we will find *mi* 5, *mi* 10, *mi* 20, *mi* 40, and *mi* 80. Thus, the Fifth of *la* being *mi* 81, and the Major Third of *do* being *mi* 80, these two *mis* are not the same, and their ratio is  $\frac{80}{81}$ , which makes precisely the major Comma.

If we pursue the progression of the Fifths to the twelfth power, which arrives at *si*-Sharp, we will find that this *si* exceeds the *do* with which it should make a unison, and which is with it in the ratio of 531441 to 524288, a ratio that gives Pythagoras' Comma. So that, by the preceding calculation, the *si*-Sharp should exceed the *do* by three major Commas, and by this it exceeds it only by Pythagoras' Comma.

But this same Sound *mi*, which makes the Fifth of *la*, must also serve to make the Major Third of *do*; the same *si*-Sharp, which forms the twelfth Fifth of this same *do*, must also make its Octave, and, finally, these different Chords must concur in constituting the general system without multiplying the Pitches. This is what is done by means of *Temperament*.

For this: 1st. One begins by the *do* in the middle of the Keyboard, and one shortens the first four Fifths in ascending until the fourth *mi* makes the Major Third quite justly with the first Sound *do*; this is what is called the first test. 2nd. By continuing to tune by Fifths, as soon as one has arrived at the Sharps, one widens the Fifths a little, although the Thirds suffer for it, and when one has arrived at *sol*-Sharp, one stops. This *sol*-Sharp should make a just or at least bearable Major Third with the *mi*; this is the second test. 3rd. One takes up the *do* again and tunes the Fifths on the low end; namely, *fa*, *si*-Flat, etc., at first weakly, then, widening them by Degrees, that is, shortening the Sounds until one reaches *re*-Flat, which, taken as *do*-Sharp, should be found to be in tune with and make a Fifth with the *sol*-Sharp, at which one had formerly stopped; this is the third test. The last Fifths will be found to be a little too wide, as with the Major

Thirds; this is what makes the major Keys of *si*-Flat and of *mi*-Flat somber and even a bit harsh. But this harshness will be bearable if the Score is well composed, and, moreover, these Thirds, by their position, are less used than the first ones, and should be so only by choice.

Organists and Organ Builders regard this *Temperament* as the most perfect that may be used. In actuality, by this method the natural Keys enjoy all the purity of the Harmony, and the transposed Keys, which form less frequent modulations, offer great resources to the Musician when he needs more marked expressions: for it is good to observe, says M. Rameau,<sup>138</sup> that we receive different impressions of the Intervals in proportion to their different alterations. For example, the Major Third, which naturally arouses joy in us, impresses upon us even ideas of fury when it is too strong; and the Minor Third, which leads us to tenderness and to softness, saddens us when it is too weak.

Skillful Musicians, continues this same Author, know how to profit opportunely from these different effects of the Intervals, and exploit, by the expression they draw from them, the alteration that might be condemned in them.

But, in his *Harmonic Generation*, this same M. Rameau takes an entirely different tone.<sup>139</sup> He reproaches himself for his condescension toward present usage, and destroying everything he had formerly established, he gives a formula for eleven proportional means between the two limits of the Octave, by which formula he wants the entire series of the chromatic system to be regulated; so that as this system results in twelve perfectly equal Semitones, it is necessary for all the like Intervals which are formed from them also to be perfectly equal to one another.

For practice, he says, take whatever key of the Keyboard you like; first tune to it the just Fifth, then diminish it a tiny bit: proceed in this way from one Fifth to another, always by ascending, that is from low to high, until the last one whose high Sound is the low part of the first one; you can be certain that the Keyboard will be in good accord.

This method M. Rameau proposes to us today was already proposed and abandoned by the famous Couperin. It is also found throughout Father Mersenne, who made its Author a certain Gallé, and who even took the trouble to calculate the eleven proportional means for which M. Rameau gives us the algebraic formula.<sup>140</sup>

In spite of the scientific air of this formula, it does not appear that the practice which results from it has until now been sampled by Musicians or Organ Builders. The first cannot resolve to deprive themselves of the energetic variety they find in the various affections of the Tones the established *Temperament* causes. M. Rameau tells them in vain that they are mistaken,

that the variety is found in the intermixings of Modes or in the various Degrees of the Tonics, and not at all in the alteration of the Intervals; the Musician answers that the one does not exclude the other, that he confines himself to convincing by means of an assertion, and that the various affections of the Tones are not at all proportional to the Degrees of their finales. For, they say, although there is only a Semitone in distance between the finale of *re* and that of *mi*-Flat, as between the finale of *la* and of *si*-Flat, nevertheless, the same Music will affect us quite differently in *A la mi re* than in *B fa*, and in *D sol re* than in *E la fa*; and the attentive ear of the Musician will never be mistaken, even when the general Key is raised or lowered by a Semitone and more—an obvious proof that the variety come from elsewhere than the simple different elevation of the Tonic.

With regard to the Organ Builders, they find that a Keyboard tuned in this manner is not at all as well tuned as M. Rameau maintains. The Major Thirds appear to them harsh and shocking, and when they are told that they only have to alter the Thirds as they had previously done to the Fifths, they reply that they do not understand how the Organ will be able to suppress the beats<sup>141</sup> that are heard by this manner of tuning, or how the ear will cease to be offended by them. Since by the nature of Consonances the Fifth can be more altered than the Third without shocking the ear and without producing beats, is it not proper to throw the alteration toward the side where it is least shocking, and preferably to leave the Intervals that cannot be altered without rendering them discordant more just?

Father Mersenne maintained<sup>142</sup> that it was said in his time that the first people who utilized Semitones on the Keyboard, which he calls *feintes*, first tuned all the Fifths in just about the same way as the equal Tuning proposed by M. Rameau; but since their ear could not bear the discord of the Major Thirds being necessarily strong, they tempered the Chord by weakening the first Fifths in order to lower the Major Thirds. It therefore appears that to accustom oneself to this manner of Tuning is not, for a trained and sensitive ear, a habit that is easy to acquire.

Besides, I cannot prevent myself from recalling here what I said at the word CONSONANCE\* [*Consonnance*] about the reason for the pleasure that Consonances produce for the ear derived from the simplicity of the ratios. The ratio of a tempered Fifth according to M. Rameau's method is this:  $\sqrt[4]{80^3} \times \sqrt[4]{81}$ . This ratio nonetheless pleases the ear. I ask: Is this by its simplicity?

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TRIO [*Trio*]. In Italian *Terzetto*. Music in three principal or reciting Parts. This type of Composition passes for the most excellent and should

also be the most regular of all. Aside from the general rules of Counterpoint, there are more rigorous ones for the *Trio*, the perfect observation of which tends to produce the most pleasant of all Harmonies. These rules all follow from this principle, that since the Perfect Chord is made up of three different Sounds, one must distribute these three Sounds in each Chord, as much as possible, to the three Parts of the *Trio* in order to fill out the Harmony. With regard to Dissonances, as they should never be doubled and as their Chord is made up of more than three Sounds, it is a still greater need to diversify them, and to properly choose, apart from the Dissonance, the Sounds which should preferably accompany it.

From whence these various rules: of not passing through any Chord without making its Third or Sixth heard; consequently, of avoiding striking the Fifth and the Octave simultaneously, or the Fourth and the Fifth; of using the Octave only with great precaution and of never sounding two in a row, even among different Parts; of avoiding the Fourth as much as is possible: for all the Parts of a *Trio*, taken two by two, should form perfect Duos. From whence, in a word, all those little detailed rules which are observed even without having been learned when their Principle is known well.

As all these rules are incompatible with the unity of Melody, and as a regular and harmonious *Trio* is never heard to have a determined and perceptible Song in performance, it follows that the *Trio* strictly speaking is a poor genre of Music. Furthermore, these rules, so severe, have been long abolished in Italy, where a Music that did not sing was never recognized as good, however harmonious it may otherwise be and whatever trouble it may have cost to compose.

It should be recalled here what I have said at the word DUO [*Duo*]. These terms *Duo* and *Trio* are understood only of the principal and obligatory Parts, and include neither Accompaniments nor filling out. In this way, a Music in four or five Parts can nevertheless be merely a *Trio*.

The French, who very much like to multiply the Parts, seeing that they discover Chords more easily than Songs, not content with the difficulties of the ordinary *Trio*, have also devised what they call a *Double Trio*, in which the Parts are doubled and all obligatory. They have a *Double Trio* by Mr. Duché<sup>143</sup> which passes for a Masterpiece of Harmony.

UNITY OF MELODY [*Unité de mélodie*]. All the fine Arts have some *Unity* of object, a source of pleasure they give to the mind: for the attention divided settles nowhere, and when two objects occupy us, it is a proof that neither of them satisfies us. In Music, there is a successive *Unity* that re-

lates to the subject, and by which all the parts, when well linked, compose a single whole whose ensemble and all of whose relationships are perceived.

But there is another *Unity* of object, finer, more simultaneous, and from which—without it being thought of—the Music's energy and the strength of its expressions arises.

When I hear our Psalms in four Parts sung, I always begin by being gripped, delighted by that full and nervous Harmony; and the first pitches, when they are intoned quite justly, move me to the point of trembling. But hardly have I heard what follows for a few minutes than my attention relaxes, the noise gradually dazes me. Soon it wearies me and I am finally bored by hearing nothing but Chords.

This effect does not occur at all when I hear good modern Music, even though its Harmony may be less vigorous; and I recall that at the Opera in Venice, far from a beautiful Aria ever boring me, as long as it lasted I gave it an always renewed attention and heard it with more interest at the end than at the beginning.

This difference comes from that of the character of the two Musics, of which the first is merely a succession of Chords and the second is a succession of Song. Now, the pleasure of Harmony is merely a pleasure of pure sensation, and the enjoyment of the senses is always short—satiety and boredom follow close behind; but the pleasure of Melody and of Song is a pleasure of interest and of feeling which speaks to the heart, and which the Artist can always sustain and renew by dint of genius.

Music should therefore necessarily sing in order to touch, to please, to sustain interest and attention. But how in our Systems of Chords and Harmony will Music set about singing? If each Part has its own Song, all these Songs, heard at the same time, will mutually destroy one another and will no longer produce Singing; if all the parts produce the same Song, there will no longer be Harmony, and the Concert will be entirely in Unison.

The way in which a Musical instinct, a certain feeling deaf to genius, has removed this difficulty without seeing it, and has even derived an advantage from it, is quite remarkable. The Harmony, which should have stifled the Melody, animates it, strengthens it, determines it; the various Parts, without being confounded, work toward the same effect, and, even though each of them seems to have its own Song, from all these Parts brought together one hears emitted only one and the same Song. This is what I call *Unity of Melody*.

This is how Harmony itself works toward this *Unity*, far from harming it. It is our Modes that characterize our Songs, and our Modes are founded

on our Harmony. Every time, then, that the Harmony strengthens or determines the feeling of the Mode and of the Modulation, it adds to the Song's expressiveness, provided that it does not cover it up.

Relative to the *Unity of Melody*, the Art of the Composer is therefore: 1st. When the Mode is not sufficiently determined by the Song, to determine it better by means of the Harmony. 2nd. To choose and work its Chords so that the most salient Sound is always that which sings, and so that the one that makes it proceed best might be in the Bass. 3rd. To add to the energy of each transition by harsh Chords if the expression is harsh, and sweet ones if the expression is sweet. 4th. To pay attention in the phrasing of the Accompaniment to the *Forte-piano*<sup>144</sup> of the Melody. 5th. Finally, to compose in such a way that the Song of the other Parts, far from contradicting that of the principal Part, sustains it, seconds it, and gives to it a more lively accent.

In order to prove that the energy of Music comes wholly from the Harmony, M. Rameau gives the example of a single Interval, which he calls a single Song, that takes on entirely different characters according to the various ways of accompanying it. M. Rameau has not seen that he proved wholly the contrary of what he wanted to prove: for in all the examples he gives, the Accompaniment of the Bass serves merely to determine the Song. A simple Interval is not at all a Song, it becomes a Song only when it has its place assigned in the Mode; and the Bass, by determining the Mode and the place this Interval has in the Mode, thereby determines this Interval to be this or that Song; so that, if the place it has in its Modulation is well determined by what precedes the Interval in the same Part, I maintain that it will have its effect without any Bass: thus, on this occasion the Harmony acts merely by determining the Melody to be this or that sort, and it is purely as Melody that the Interval has different expressions according to the place of the Mode where it is employed.

The *Unity of Melody* requires that two Melodies never be heard at the same time, but not that the Melody never pass from one Part to another; on the contrary, it is often elegant and tasteful to handle this transition properly, even from the Song to the Accompaniment, provided that the speech always be understood. There are even learned and properly handled Harmonies in which the Melody, without being in any Part, results solely from the effect of the whole. One will find (Plate M, Figure 7) an example, which, although crude, suffices in order to make what I want to say understood.

A Treatise would be needed in order to show in detail the application of this principle to *Duos*, *Trios*, *Quartets*, to Choruses, to Instrumental Pieces.



## Song Derived from the Harmony



Plate M, Figure 7

Men of genius will sufficiently discover its extent and use, and their works will instruct others. I therefore conclude, and I say, that from the principle I have just established it follows: firstly, that every Music that does not sing is tiresome, whatever Harmony it may have; secondly, that every Music in which several simultaneous Songs are distinguished is bad, and that the same effect results as from two or more discourses pronounced at the same time in the same Tone. By this verdict, which admits of no exception, it is seen what should be thought of those marvelous pieces of Music in which an Aria serves as the Accompaniment to another Aria.

It is this principle of the *Unity* of Melody which the Italians have felt and have followed without knowing it, but which the French have neither known nor followed. It is, I say, in this great principle that the essential difference between these two Musics consists; and it is, I believe, what every impartial judge will say who should give the same attention to them both, if however the thing is possible.

When I had discovered this principle, I wanted to try applying it on my own before proposing it. This attempt produced the *Devin du Village*; after this success, I spoke of it in my *Letter on French Music*.<sup>145</sup> It is for the Masters of the Art to judge whether the principle is good, and whether I have indeed followed the rules which flow from it.

VOICE [*Voix*], *n. fem.* The sum of all the Sounds that a man can—by speaking, singing, or shouting—draw from his organ forms what is called his *Voice*, and the qualities of this *Voice* also depend upon those of the Sounds that form it. Thus, one should first of all apply to the *Voice* everything I have said about Sounds in general. (See SOUND\* [*Son*].)

Physicists distinguish different sorts of *Voice* in man, or, if one likes, they consider the same *Voice* under different aspects.

1. As a simple Sound, such as the cry of children.
2. As an articulated Sound, such as it is in speech.
3. In Song, which adds Modulation and variety of Tones to speech.
4. In declamation, which appears to depend upon a new modification in Sound and in the very substance of the *Voice*—a modification different from that of Song and that of speech, since it can be united to either of them, or omitted from them.

From whence these divisions are drawn can be seen from the explanation M. Duclos gives of these different sorts of *Voices* in the *Encyclopedia* at the article *Declamation of the Ancients*.<sup>146</sup> I shall content myself with transcribing here what he says about the singing or musical *Voice*, the sole one that relates to my subject.

“Following Aristoxenus, Ancient Musicians established: 1st. That the Singing *Voice* passes from one degree of raising or of lowering to another degree, that is, from one Tone to another, by leaping, without moving through the Interval that separates them; whereas that of discourse is raised and lowered by a continuous movement. 2nd. That the Singing *Voice* is sustained on the same Tone, considered as an indivisible point, which does not happen in simple pronunciation.

“This progression by leaps and with pauses is in fact that of the Singing *Voice*; but is there nothing more in Singing? There is a tragic Declamation which allows the transition by leaping from one Tone to another, and pausing on a Tone. The same thing is noted in certain Orators. Nevertheless, this Declamation is still different from the Singing *Voice*.

“M. Dodart, who joins to an intelligence in discussion and research the greatest knowledge of Physics, of Anatomy, and of the working of the parts of the human body, has applied his especial attention to the organs of the *Voice*.<sup>147</sup> He observes, 1st, that a man whose speaking *Voice* is displeasing sometimes has a very pleasant Singing, and, on the contrary, 2nd, that if we have not heard someone sing, whatever knowledge we have of his speaking *Voice*, we will not recognize his Singing *Voice*.

“By continuing his researches, M. Dodart discovered that there is more movement of the larynx in the Singing *Voice* than in the speaking [*Voice*], that is, of the tracheal artery which forms a new canal that ends at the glottis, which envelops and supports its muscles. The difference between the two *Voices* therefore comes from the difference between the taut larynx being stable and at rest on its cords, in speech, and this same larynx suspended on its cords in action and moved by a swaying back and forth from

high to low and from low to high. This swaying can be compared to the movement of birds who hover, or of fish who remain in the same place against the flow of the water. Although the wings of the ones and the fins of the others appear immobile to the eye, they make continual vibrations, but so short and so quick that they are imperceptible.

“In the Singing *Voice*, the moving back and forth of the larynx produces a type of undulation which is not found in simple speech. The undulation, sustained and moderated in beautiful *Voices*, makes itself perceived too much in quivering or weak *Voices*. This undulation should not be confused with the Cadenzas or the Roulades that are made by very quick and very delicate motions of the opening of the glottis, and which are made up of the Interval of a Tone or of a Semitone.

“The *Voice*, whether of Singing or of speech, comes entirely from the glottis for the Sound and for the Tone; but the undulation comes entirely from the moving back and forth of the whole larynx; it does not at all make up part of the *Voice*, but it affects its totality.

“It results from what has just been explained that the Singing *Voice* consists in the progression by leaps from one Tone to another, in it remaining on the Tones, and in this undulation of the larynx which affects the totality and the very substance of the Sound.”

Although this explanation is quite clear and quite philosophic, in my view it leaves something to be desired, and this characteristic of undulation, given by the moving back and forth of the larynx to the Singing *Voice*, appears to me to be no more essential to it than the progression by leaps and the resting on Tones which, in M. Duclos’s view, are not specific characteristics of this *Voice*.

For, first of all, this undulation can be given to or taken away from the *Voice* at will when singing, and one does not any less sing when one draws out a purely unified Sound without any type of undulation. Secondly, the Sounds of Instruments do not differ in any way from those of the Singing *Voice* as to the nature of their musical Sounds, and themselves have nothing of this undulation. Thirdly, this undulation is formed in the Tone and not in the Timbre; the proof of this is that this undulation is imitated on the Violin and on other Instruments, not by any moving back and forth like the motion assumed in the larynx, but by moving the finger back and forth on the String, which, thus alternately and almost imperceptibly shortened and lengthened again, renders two alternating Sounds in proportion as the finger moves back or advances. Thus, the undulation, whatever M. Dodart says about it, does not consist in a very slight moving back and forth of the same Sound, but in the more or less frequent alternation of two very close Sounds, and when the Sounds are too far re-

moved, and if the alternating jolts are too abrupt, then the undulation becomes shaky.

I would think that the true distinctive characteristic of the *Singing Voice* is that of forming discernible Sounds whose Unison can be taken or perceived, and of passing from one to another by harmonic and commensurable Intervals, whereas, in the speaking *Voice*, either the Sounds are not sufficiently sustained, and, so to speak, sufficiently unified to be capable of being discerned, or the Intervals which separate them are not sufficiently harmonic, or their relationships sufficiently simple.

The observations M. Dodart made concerning the difference of the speaking *Voice* and the *Singing Voice* in the same man, far from contradicting this explanation, confirm it; for, as there are more or less harmonious Languages, whose accents are more or less Musical, it is also noted that in these languages the speaking and *Singing Voices* draw near or grow distant from one another in the same proportion. Thus, as the Italian Language is more Musical than the French, its speech is less distant from Singing; and it is easier to recognize the man one has heard speaking when he is Singing. In a Language which was totally harmonious, such as the Greek Language was in its beginnings, the difference between the speaking *Voice* and the *Singing Voice* would be null; one would have only one and the same *Voice* for speaking and for singing; perhaps this is still the case today for the Chinese.

This is perhaps too much concerning the different genera of *Voices*; I return to the *Singing Voice*, and I will confine myself to it for the remainder of this article.

Each Individual has his particular *Voice* which distinguishes him from every other *Voice* by some difference that belongs to it, as one face is distinguished from another; but there are also those differences which are common to several people, and which, forming so many types of *Voices*, each requires a specific denomination.

The most general characteristic that distinguishes *Voices* is not that which is derived from their Timbre or from their Volume, but from the Degree this Volume occupies in the general System of Sounds.

*Voices* are therefore generally distinguished into two classes; namely, high *Voices* and low *Voices*. The common difference from one to the other is just about an Octave; which makes high *Voices* actually sing at the Octave of the low *Voices*, when they seem to be singing in Unison.

Low *Voices* are usually those of grown men; high *Voices* are those of women. Eunuchs and children also have about the same Diapason of *Voice* as women; all men can even approach it by singing Falsetto. But of all the high *Voices*, it must be agreed that, despite the predilection of the Italians

for Castrati, there is no type comparable to that of women, either for the range or for the beauty of the Timbre. The *Voices* of children have little consistency and no lower register at all; that of Eunuchs, on the contrary, has brilliance only in the high register; and as for the Falsetto, it is the most disagreeable of all the Timbres of the human *Voice*: to be convinced of this, it is enough to hear the Choruses at the *Concert Spirituel* in Paris, and to compare the Sopranos there with those at the Opera.<sup>148</sup>

All these different Diapasons, united and put into order, form a general range of about three Octaves, which has been divided into four parts, three of which, called the High Tenor, the Tenor, and the Bass, belong to the low *Voices*, and the fourth alone, which is called the Soprano, is assigned to high *Voices*. Concerning which here are some remarks which present themselves.

I. According to the compass of ordinary *Voices*, which can be fixed at about a major Tenth, by placing two Interval Degrees between each type of *Voice* and that which follows it, which is the whole degree of difference that can be given to them, the general System of human *Voices* in the two sexes is made to exceed three Octaves, and should contain only two Octaves and two Tones. It was in fact to this range that the four Parts of Music were confined, long after the invention of Counterpoint, as is seen in the Compositions of the Fourteenth century, where the same Clef, placed from Line to Line at four consecutive positions, served for the Bass, which they called *Tenor*, for the Tenor, which they called *Contratenor*, for the High Tenor, which they called *Mottetus*, and for the Soprano, which they called *Triplum*. This distribution must in truth have made Composition very difficult; but at the same time Harmony was more restricted and more pleasant.

II. To push the vocal System to the range of three Octaves with the gradation of which I was just speaking, six Parts were needed instead of four; and nothing would be more natural than this division, not in relation to the Harmony, which did not include so many different Sounds, but in relation to the *Voices*, which are now fairly poorly distributed. Indeed, why are there three Parts in men's *Voices* and only one in women's *Voices* if the totality of the latter contains as great a range as the former? Let one measure from the Interval of the highest Sounds of the highest feminine *Voices* to the lowest Sounds of the lowest feminine *Voices*, let one do the same thing for men's *Voices*, and not only will one not find a sufficient difference to establish three Parts on the one hand and only one on the other, but this very difference, if there is any, will be reducible to a very small degree. In order to judge this soundly, one must not limit oneself to examining things such as they are, but one must further see what they

could be and consider that custom contributes a great deal to forming *Voices* according to the character one wants to give them. In France, where Basses and Countertenors are wanted, and where no importance at all is attached to Contraltos, men's *Voices* take on different characters and women's *Voices* hold to only a single one; but in Italy, where as much importance is attached to beautiful Altos as to the highest *Voice*, are found very beautiful low *Voices* among the women which they call *Contr'alti*, and very beautiful high *Voices* which they call *Soprani*; on the contrary, they have for recitation only *Tenori* for the men's *Voices*, so that while there is only one character for women's *Voices* in our Operas, in theirs they have only one character for men's *Voices*.

With regard to Choruses, if their Parts are generally distributed in Italy as they are in France, it is a universal, but arbitrary custom which has no natural foundation at all. Besides, are not very beautiful pieces of Music for grand Chorus, performed solely by young women, admired in several places, and singularly so in Venice?<sup>149</sup>

III. The distance which is too great between *Voices* and makes them all exceed their range often obliges one to subdivide several of them. It is in this way that Basses are divided into Countrabasses and Bass Tenors, Tenors into High Tenors and Concordants, Sopranos into firsts and seconds; but nothing determinate is perceived in any of this, nothing regulated according to any principle. The general spirit of French Composers is always to force *Voices* in order to make them shout rather than sing: it is for this reason that they today appear to confine themselves to Basses and High Tenors, which are in the two extremes. With regard to the Tenor, a Part so natural to man that it is called the *human Voice par excellence*, it is already banished from our Operas, where nothing natural is desired; and by the same reason, it will not take long for it to be so from all French Music.

*Voices* are further distinguished by many other differences than those of low and high. There are loud *Voices* whose Sounds are loud and striking, soft *Voices* whose Sounds are soft and flute-like, big *Voices* which have a large range, beautiful *Voices* whose sounds are full, just, and harmonious, and there are also those contrary to all these. There are harsh and heavy *Voices*; there are flexible and light *Voices*; there are some whose beautiful Sounds are unequally distributed, some of them in the high range, others in the *Middle*, others in the low range; there are also equal *Voices*, which make the same Timbre heard through their whole range. It is for the Composer to take advantage of each *Voice* so that its character is most advantageous. In Italy, where each time an Opera is put on again in the Theater it is always a new Music, the Composers always take great care to apportion all the roles to the *Voices* that should sing them. But in France, where the

same Music endures for centuries, each role must always serve for all the *Voices* of the same type, and this is perhaps one of the reasons why French Singing, far from acquiring any degree of perfection, becomes every day more drawn out and ponderous.

The most extensive, the most flexible, the sweetest, the most harmonious *Voice* that has perhaps ever existed appears to have been that of the Chevalier Baldassare Ferri, a Perugian, from the last century.<sup>150</sup> A unique and prodigious Singer, whom all the Sovereigns of Europe took turns in fighting over, who was heaped with goods and with honors during his lifetime, and whose talents and glory after his death all of Italy's Muses vie with one another in celebrating. All the works written to praise this famous Musician breath with rapture, enthusiasm, and the agreement of all his contemporaries shows that a talent so perfect and so rare was even above envy. Nothing, they say, can express the brilliance of his *Voice*, nor the gracefulness of his Singing; he had, in the highest degree, all the characteristics of perfection in all the genera; he was gay, haughty, grave, tender at his will, and hearts melted at his pathos. Among the infinity of *tours de force* he made with his *Voice*, I will cite only a single one. He ascended and redescended two full Octaves in a single breath by a continual Trill marked on all the chromatic Degrees with such justness, although without Accompaniment, that if this Accompaniment was struck quickly under the note on which he was, whether Flat or Sharp, the Accord was instantly perceived with a justness that surprised all the Listeners.

The vocal and reciting parts for which a Piece of Music is composed are also called *Voices*; thus, one speaks of a Motet in a single *Voice* instead of saying a Motet in recitative, a Cantata in two *Voices* instead of saying a Cantata in Duo or in two Parts, etc. (See DUO [*Duo*], TRIO\* [*Trio*].)



EDITOR'S NOTES TO  
*Dictionary of Music*

This translation is based on text found in *Pléiade*, V, 603–1191 (inclusive). The *Pléiade* edition of the work is not fully edited and awaits a new edition. The original edition of Rousseau's *Dictionary of Music* (Paris: Duchesne, 1768; reproduced by Georg Olms Verlagsbuchhandlung and Johnson Reprint Company [Hildesheim and New York, 1969]), has also been consulted.

The articles from the *Dictionary of Music* included here have been selected for their importance to understanding Rousseau's musical and aesthetic theory. Rousseau himself claims the importance of some of these articles. In his *Dialogues* (*Collected Writings*, I, 17–18) he indicates the following articles: ENHARMONIC [*Enharmonique*], EXPRESSION [*Expression*], FUGUE [*Fugue*], GENIUS [*Génie*], HARMONY [*Harmonie*], LICENSE [*Licence*], MODE [*Mode*], MODULATION [*Modulation*], PREPARATION [*Préparation*], RECITATIVE [*Récitatif*], and TRIO [*Trio*]. In a letter to Joseph-Jérôme le François de Lalande (March 4, 1768; Leigh, XXXV, 160–161), Rousseau lists the following articles as particularly important: ACCENT [*Accent*], CONSONANCE [*Consonnance*], DISSONANCE [*Dissonnance*], ENHARMONIC [*Enharmonique*], EXPRESSION [*Expression*], TASTE [*Gout*], HARMONY [*Harmonie*], INTERVAL [*Intervalle*], LICENSE [*Licence*], OPERA [*Opéra*], SOUND [*Son*], TEMPERAMENT [*Tempérament*], UNITY OF MELODY [*Unité de mélodie*], VOICE [*Voix*]. The other articles included here were selected by the translator because they expand on the theory of musical expression that underlies Rousseau's musical and aesthetic doctrine.

The articles included here are alphabetized by the French term. This ordering does not usually pose any difficulty for the English reader because of the similarity or identity of most of the French and English terms. Within his articles, Rousseau includes frequent cross-references to other articles. The articles included in this translation have been indicated by an asterisk added to the cross-referenced article. For example, the article HARMONY\* [*Harmonie*] is included in this translation, but the article SYSTEM [*Système*] is not included.

1. "So as to learn about the matter of songs," Martianus Capella, *De Musica* (= *De Nuptiis Philologiae et Mercurii*, IX), 904. The passage refers to the crowd of maidens who gather to hear Harmony expound upon her art.

2. Claude Sallier (1685–1761) was a philologist and bibliographer who directed the Royal Library toward the end of his life.

3. For Rousseau's explanation for his withdrawal from Parisian society to the

Hermitage near Montmorency in April 1756, see *Confessions*, IX (*Collected Writings*, V, 337–351).

4. Rousseau was then living in Môtiers-Travers, as indicated in the dating at the end of the Preface, below. For Rousseau's account of his flight from Paris and then Geneva and his stay at Môtiers, see *Confessions*, XII (*Collected Writings*, V, 499–532).

5. Abbé Sébastien de Brossard, whose *Dictionnaire de musique, contenant une explication des termes grecs, latins, italiens, et françois* (1703) was the first musical dictionary in France, and the only one before Rousseau's.

6. Giuseppe Tartini (1692–1770) was an Italian composer, violinist, teacher, and musical theorist whose *Trattato di musica secondo la vera scienza* (1754), which tried to reconcile empirical observation with classical harmonics and the laws of physics, was admired by Rousseau.

7. In the article SYSTEM [*Système*], Rousseau explains:

Until our century, Harmony, born gradually and as by chance, had only scattered rules, established by the ear, confirmed by use, and which seemed absolutely arbitrary. M. Rameau is the first who, by the System of the Fundamental Bass, gave principles to these rules. Since his *System*, on the basis of which this Dictionary has been assembled, has been sufficiently developed in its principal Articles, it will not be explained in this one, which is already too long, and which those senseless repetitions would elongate still further to the point of excess. Moreover, the object of this work does not oblige me to explain all *Systems*, but solely to explain well what one *System* is, and to clarify that explanation as need be with examples. Those who would like to see M. Rameau's *System*—so obscure, so vague in his own writings—explained with a clarity of which one would not believe possible will be able to refer to M. d'Alembert's *Elements of Music*.

M. Serre of Geneva, having found M. Rameau's principles insufficient in quite a number of respects, has devised another *System* based on his own, in which he claims to show that every Harmony is borne on a double Fundamental Bass; and as this Author, having traveled in Italy, is not unaware of M. Tartini's experiments, he composed, by joining them with those of M. Rameau, a mixed *System*, which he had printed in Paris in 1753, under the title: *Essays on the Principles of Harmony*, etc. The ease with which this work can be consulted, and the advantage that is found in reading it in its entirety, also excuses me from having to offer an account of it to the public.

It is not the same with that of the illustrious M. Tartini, of which it remains for me to speak, which, being written in a foreign language, often profound and always vague, is only within reach of being consulted by very few people, even the majority of whom are rebuffed by the obscurity of the Work, before being able to sense its beauties. I will write, as briefly as is possible for me, an extract of this new *System*, which, if it is not that of Nature, is at least, of all those that have been published until now, that whose principle is the simplest, and from which all the laws of Harmony seem to arise least arbitrarily. (Pléiade, V, 1082–1083)

D'Alembert's *Elements of Music* (*Eléments de l'harmonie théorique et pratique*; 1st ed., 1753; 2nd ed., 1762) provided a clear explanation of Rameau's musical system.

Jean-Adam Serre (1704–1788) was a Genevan physicist, chemist, painter, and musical theorist who published criticisms of Rameau's theory of harmony, including his *Essais sur les principes de l'harmonie* (1753), to which Rousseau refers.

8. Readers of the *Dictionary* might suspect Rousseau's animus toward French music and partiality for Italian music because of his previous writings, notably the *Letter on French Music*. Rousseau alludes just below to his role in the debate over French and Italian music.

9. For Rousseau's fears that his articles on music had been plagiarized, see *Dialogues*, First Dialogue (*Collected Writings*, I, 17–18).

10. "Accent is more or less song," Sergius, or sometimes Servius (date unknown), *Commentarius in artem donati* (ed. Heinrich Keil, *Grammatici Latini*, 8 vols. [Leipzig, 1864], IV, 482). The full text of the reference is: "Spoken accent is more or less song according to the Greeks, who call it *prosodian*." Sergius' work is a commentary on the major work of the famous grammarian Aelius Donatus.

11. Dionysius of Helicarnassus, *Synthesis*, 15.

12. Pierre-Joseph Thouliez, Abbé d'Olivet, *Traité de la prosodie française* (1736).

13. The Port-Royal Grammar is the popular name for the *Grammaire générale et raisonnée* by Antoine Arnauld and Nicholas Lancelot, first published in 1664. Charles Pinot Duclos, Rousseau's friend, wrote a commentary on that work, *Remarques sur la Grammaire générale et raisonnée* (1754).

14. "Air" used in this sense has usually been translated elsewhere as "aria."

15. "Beautiful nature" translates "*la belle nature*," which was a technical term of eighteenth-century aesthetics that had a wide and usually vague meaning.

16. Denis Dodart, "Supplément au Mémoire sur la voix et sur les tons" (1706), 178–184.

17. Giacobbo Rodrigo Pereira or Pereire (1715–1780) presented his method for teaching the deaf to the Academy of Sciences in Paris in 1749. Rousseau mentions Pereira in his *Essay on the Origin of Languages*, chap. I, translated above.

18. Originally in French verse, drawn from d'Alembert's article "*Compositeur*" in the *Encyclopédie* (1753; III, 769).

19. Arcangelo Corelli (1653–1713) was an Italian composer whose works were important in the development of the baroque sonata form. Leonardo Vinci (c. 1690–1730) was a leading Neapolitan composer of *opera seria*. David Perez (1711–1779) was a Neapolitan opera composer of Spanish descent. Rinaldo da Capua (c. 1705–c. 1780) was a Neapolitan composer of sacred music and opera. Niccolò Jomelli (1714–1774) was a prolific Neapolitan composer of opera and sacred music. Francesco Durante (1684–1755) was a Neapolitan composer of sacred music and influential teacher. Leonardo Leo (1694–1744) was a leading Neapolitan composer. Giovanni Battista Pergolesi (1710–1736) was a composer of operas and other vocal pieces, including the opera buffa *La serva padrona*. Johann Adolf Hasse (1699–1783) was the most widely admired composer of *opera seria* in Italy and Germany at that time. Domenico Terradellas or Terradeglias (1713–1751) was a Spanish-born composer of opera and other vocal music in the Neapolitan style. Baldasare Galuppi (1706–1785) was a Venetian composer crucial to the development of the *opera buffa* style.

20. In this article, “Accord” translates “*Accord*,” which is usually translated “Chord.” The two usages are related, for a chord is the recognized accord of two or more sounds heard simultaneously.

21. Jean-Jacques Dortous de Mairan (1678–1771) was a mathematician, physicist, and philosopher whose study of acoustics, the “Discours sur la Propagation du Son dans les différents Tons qui le modifient,” was published in the *Histoire de l’Académie Royale des Sciences* in 1737. Mairan was one of the three academicians commissioned in 1741 to examine further Rousseau’s “Plan Concerning New Signs for Music.” Rameau adopted Mairan’s hypotheses in his *Génération harmonique* (1737). Mairan, and Rameau after him, drew an analogy of light and color to sound, an analogy to which Rousseau alludes just below. For a discussion of Mairan and Rameau, see Thomas Christensen, *Rousseau and Musical Thought in the Enlightenment* (Cambridge: Cambridge University Press, 1993), 139–142.

22. The “Philosopher” in question is Denis Diderot, whose “Principes généraux d’acoustique” was published in 1748 as the first of his *Mémoires sur différents sujets de mathématiques*. See 235–239, 255–258.

23. René Descartes (1596–1650), the great philosopher, also wrote a work on music, the *Compendium musicae* (1618).

24. Pierre Estève (1720–after 1758) was a French physicist, academician, and literary figure who wrote works on the fine arts, including his *L’Esprit des beaux-arts* (1753), and on music, including his *Nouvelle découverte du principe de l’harmonie, avec un examen de ce que M. Rameau a publié sous le titre de Démonstration de ce principe* (Paris, 1751). Estève later wrote a pamphlet against Rousseau’s *Letter on French Music*.

25. Sauveur, *Principes d’acoustique et de musique* (1701). “Beats” are an acoustical phenomenon resulting from the interference of two sound waves of slightly different frequencies that are heard as minute but perceptible intensifications of a sound at regular intervals.

26. For the version of this article in the *Encyclopedia*, see pp. 215–218 above.

27. Marin Mersenne, *Harmonie universelle contenant la théorie et la pratique de la musique* (1636), Book II. Mersenne tries to explain the origin of the dissonance as a “supposed” fifth below the tonic.

28. The first work to which Rousseau refers is Rameau, *Nouveau système*, chap. II: “If one does not at all hear a Dissonance in the resonance of a sounding Body, this proves that they are not natural in Harmony and, consequently, they can be introduced into it only with the aid of Art” (Jacobi, II, 65). The second work in question is his *Génération harmonique* (1737), chap. 9 (Jacobi, III, 68).

29. Rousseau presents a summary of d’Alembert’s discussion of dissonance in his *Eléments de l’harmonie théorique et pratique* (2nd ed., 1762).

30. Giuseppe Tartini (1692–1770) was an Italian composer, violinist, teacher, and musical theorist whose *Trattato di musica secondo la vera scienza* (1754), which tried to reconcile empirical observation with classical harmonics and the laws of physics, was admired by Rousseau.

31. For the version of this article in the *Encyclopedia*, see pp. 219–221 above.

32. Rousseau refers to Ptolemy’s discussion of Aristoxenus, *Elementa Harmonica*, I.12 (Barker, II, 301–303).

33. Aristides Quintilianus (third or fourth century A.D.), *De musica*, I.9 (Barker, II, 417–418).

34. Pseudo-Plutarch, *De musica*, 1134f–1135b, 1145a (Barker, I, 215–218, 244–245). *De musica* was formerly attributed to Plutarch.

35. The “Trio of the Furies” is the second trio of the Furies in Rameau’s lyric-tragedy *Hippolyte et Aricie* (1733). The trio was successfully performed by the private orchestra of Rameau’s patron, La Pouplinière, but the singers at the Paris Opera were unable to sing it and it had to be omitted. Rameau recounts the episode and claims that it was elsewhere performed in his *Génération harmonique* (1737), chap. XIV (Jacobi, III, 89 ff.) and his *Démonstration du principe de l’harmonie* (1750), 95–96 (Jacobi, III, 213–214).

36. Rameau describes the bad performance and poor reception of this part of his heroic opera-ballet *Les Indes galantes* (1735) in his *Démonstration du principe de l’harmonie* (1750), 95–96 (Jacobi, III, 213–214).

37. D’Alembert, *Eléments de musique théorique et pratique* (2nd ed.; 1762), Book I, chaps. 20 and 22, Book II, chap. 14. In the last chapter cited, d’Alembert refers to several works by Rameau where the enharmonic is employed, including the example of the earthquake in his *Indes galantes*.

38. Rousseau defines the obligatory recitative as a recitative intermixed with melody played by the orchestra, thereby so to speak obliging the person doing the recitative and the orchestra to be attentive to and to await one another, and cites his own *Le Devin du village* as the first use of the device in French music (OBLIGATORY RECITATIVE [*Récitatif obligé*]; Pléiade, V, 1012–1013).

39. *Orfeo* is one of the many works attributed to Pergolesi (see note 19 above) but actually by another composer, in this case Luigi Rossi (1598–1653), singer, organist, and composer whose *Orfeo* was first produced in 1647.

40. Rousseau claims in his *Dialogues* that he included this article “only as a joke” (*Collected Writings*, I, 19). As he also notes there, however, the article was much-cited, and it would also become quite influential as a sort of manifesto of a new aesthetics. Rousseau’s suggestion that the article was a joke may be intended to be provocative rather than serious.

41. For Leo, Durante, Jomelli, and Pergolesi, see note 19 above.

42. Pietro Metastasio (1698–1782) was an Italian poet and extremely popular librettist.

43. Nicomachus (c. A.D. 50–100), *Enchiridion*, chap. 2 (Barker, II, 248–250).

44. Sauveur, *Principes d’acoustique et de musique* (1701). For Mersenne see note 27 above. For d’Alembert see note 7 above.

45. For Tartini, see note 6 above.

46. Rousseau refers to Rameau’s *Démonstration du principe de l’Harmonie* (1750). The *Demonstration* was originally presented as a “Mémoire” to the Academy of Sciences, whose approbation he published with the work. D’Alembert, a member of the committee which examined and approved of Rameau’s “Mémoire,” justified his later criticisms of Rameau’s theories (for example in his article FONDAMENT in the *Encyclopedia*) by complaining that Rameau abused the Academy’s authority and misled the public by entitling his work a “Demonstration.” Pierre Estève (b. 1720),

French physicist, academician, and literary figure who wrote works on the fine arts, including his *L'Esprit des beaux-arts* (1753) and on music, including his *Nouvelle découverte du principe de l'harmonie, avec un examen de ce que M. Rameau a publié sous le titre de Démonstration de ce principe* (1751). Estève later wrote a pamphlet against Rousseau's *Letter on French Music*.

47. Compare Rousseau, *Essay on the Origin of Languages*, chap. XVIII, translated above.

48. Charles Batteux, *Les Beaux-arts réduits à un même principe* (1746).

49. Rousseau uses almost exactly the same passage in his *Essay on the Origin of Languages*, chap. XVI, translated above. See also a letter to d'Alembert (June 26, 1751; Leigh, II, 159–160): “The art of the musician does not at all consist in immediately portraying the objects, but in putting the soul into a disposition similar to that in which their presence would put it.”

50. Aristoxenus, *Elementa Harmonica*, I.15–16 (Barker, II, 136–137).

51. Baccheius Geron (third–fourth century A.D.), *Eisagogē*; Gaudentius, *Harmonica introductio*.

52. Adrastus (c. second century A.D.) was a Greek philosopher cited by Meibomius in his edition of Theon of Smyrna (Barker, II, 222). Marc Meibom (latinized as Marcus Meibomius) (1620–1711) was a Danish historian and philologist who edited an influential collection of ancient musical writings, the *Antiquae musicae auctores septem, Graece et Latine*, 2 vols. (Amsterdam, 1652). Rousseau used Meibomius' collection as his major source on ancient music.

53. Theon of Smyrna (second century A.D.), *Mathematics Useful for Reading Plato*, II.xiii (Barker, II, 213).

54. For Rousseau's explanation of the Monocord, see the article SOUND [*Son*], translated below.

55. “Meaning” translates “*sens*,” which can also mean “sense” or “sensation.” Rousseau's argument is that, through melody, music is a kind of language.

56. Rousseau gives a very rough paraphrase of d'Alembert, *Eléments de musique théorique et pratique* (2nd ed.; 1762), Book I, chap. 2, pp. 22 ff.

57. That is, the “leading tone” (*note sensible*) is so called because it causes to the key to be perceived (*fait sentir*).

58. Charles-Henri de Blainville (1711–1769) was a cellist, composer, and musical theorist whose *Essai sur le troisième mode* was published in 1751 and who at the same time presented a concert as an example of his theory at the *Concert Spirituel* at the Tuileries palace. See a letter from Rousseau to Raynal on hearing the concert, May 30, 1751 (Leigh, II, 155–159). See also a letter from Blainville to Rousseau, September 1751 (Leigh, II, 164–166).

59. Pseudo-Euclid (c. 300 B.C.), *Elements of Geometry*; Ptolemy, *Harmonics*, II.10–11 (Barker, II, 336–340).

60. Pseudo-Plutarch, *De musica*, II41C–II42A (Barker, I, 235–238). *De musica* was formerly attributed to Plutarch. The dialogue contains a synopsis of Pherecrates' (c. 440–420 B.C.) play *Chiron*, in which Music, dressed as a woman, complains that instead of commanding poetry as of old, now she is stripped of her rightful place and accustomed power.



61. Alypius (third or fourth century A.D.), *Eisagoge*.
62. Giovanni Battisti Doni (1595–1647) was an Italian classicist, philologist, and musical theorist who devoted himself to the rediscovery of Greek music.
63. “Morals” translates the French “*mœurs*,” which has the broad sense of customs or mores. See Plato, *Republic*, III.398c–399e.
64. Pseudo-Euclid (c. 300 B.C.), *Elements of Geometry*. Aristoxenus, *Elementa Harmonica*, II.37–38 (Barker, II, 153–154).
65. Ptolemy, *Harmonics*, II.7–11 (Barker, II, 331–340).
66. Guido of Arezzo (991–c. 1033), sometimes called “Aretino,” was one of the most influential musical theorists of the Middle Ages. He developed a system of precise pitch notation by lines and spaces and developed a method of sight-singing relying on the syllables *ut, re, mi, fa, sol, la, si*, which he derived from a hymn to St. John and which is known as the Aretinian system.
67. Abbé Sébastien de Brossard, *Dictionnaire de musique, contenant une explication des termes grecs, latins, italiens, et françois* (1703), s.v., “*Modo*,” “*Tempo*,” and “*Prolazione*.”
68. The first word in this sentence that is translated “scale” is “*gamme*,” which is the “natural” scale derived from just intonation, while the second word translated “scale” is “*échelle*,” which is any scale, “natural” or tempered. The word translated as “scale” in the next paragraph is “*gamme*.”
69. Christiaan Huygens (1629–1695), the physicist and astronomer, also wrote a work on music, the *Novus cyclus harmonicus* (1661).
70. Orpheus was a mythical or semimythical musician, poet, and mystic. Terpander was a Greek musician and poet of the seventh century B.C. Stesichorus was a Greek lyric poet of about the sixth or seventh century B.C.
71. Boethius (fifth century A.D.), *De Institutione Musica*.
72. Aristides Quintilianus (third or fourth century A.D.), *De Musica* 1.4, where music is defined as “knowledge of what is appropriate in sounds and in the movements of bodies.”
73. Athanasius Kircher, *Prodomus Coptus Aegyptiacus* (1635), 131, 138. Diodorus Siculus (c. 80–c. 21 B.C.) discusses the invention of music by Hermes in his *General History*, I.i.16.
74. For the relationship between speech and song, see *Essay on the Origin of Languages*, chaps. XII and XIV, translated above.
75. Porphyry (c. 232–c. 300 A.D.), *Commentary on the Harmonics of Ptolemy*, I.1.
76. Rousseau’s reference is unclear.
77. Hesychius (fifth century A.D.), *Lexicon*.
78. The modern musician to whom Rousseau refers is Rameau, who argues in his *Observations on Our Instinct for Music*, and other works, that music is the “mother” of all the sciences and arts (see p. 177 above).
79. Diodorus Siculus (first century B.C.–first century A.D.), *General History*, I.i.16.
80. Lucretius, *De rerum natura*, V.1379–1383: “But imitating the flowing voices of birds with the mouth was long in use before men could try with tuneless song to enchant the ear; and Zephyr’s whistling through hollow reeds first taught rustic men to blow through shepherd’s hollow pipes.”
81. Chiron the centaur was the legendary teacher of Achilles. Demodocus was a



blind epic singer mentioned in Homer's *Odyssey* (IX.44 ff.). Hermes was the Greek messenger God. Orpheus was a mythical or semimythical musician, poet, and mystic. Phemius was a renowned epic singer mentioned in Homer's *Odyssey* (XI, XVI). Terpander was a Spartan musician and poet of the seventh century B.C. (Lycurgus was the semilegendary refounder of Sparta). Thaletas was a Spartan acolist and musician of the seventh century B.C. Thamyris was a mythical epic singer from Thrace discussed in the pseudo-Plutarchian *De Musica* (1132a–b).

82. Rousseau's general source is the pseudo-Plutarchian, *De Musica*, 1141c–1142a. Lasus (b. c. 548–545 B.C.) was born in Hermione and lived at the court of Hipparchus, tyrant of Athens, where he composed hymns and dithyrambs. Melanippides (c. 480–c. 414 B.C.) was an innovative composer of dithyrambs. Philoxenus (c. 435–380 B.C.) was an innovative composer of dithyrambs. Timotheus (c. 450–c. 360 B.C.) was an innovative composer of dithyrambs and music for the cithar. Phrynnis (b. c. 475 B.C.) was an aulist and citharist and leading innovator of the period. Epigonus (sixth century B.C.) was a musician who was said to have invented a forty-stringed instrument called an Epigoneion. Lysander (sixth century B.C.) was a musician and citharist said to have instituted solo cithar playing. Simicus is unknown except for it being assumed that the thirty-five-stringed instrument called a "simicion" was named after him. Diodorus (fifth century B.C.), known also as Pronomus, was a famous aulist who was the first to play all of the harmonia on the same aulos.

83. For Lasus, Epigonus, and Simmicus, see the previous note.

84. For Diodorus and Timotheus, see note 82 above.

85. Plato, *Republic*, IV.424c: "For never are the ways of music moved without the greatest political laws being moved" (trans. Bloom). See also III.398c–402a.

86. Aristotle, *Politics*, VIII.5–7. "Morals" in this sentence and the next one translates "*mœurs*, which has a broader sense of customs or mores.

87. Polybius, *Histories*, IV.20–21.

88. Athenaeus, *Deipnosophistae*, 626a–629c.

89. For Timotheus, see note 82 above. Rousseau's source for the example of King Eric of Denmark and the examples in this and the following several paragraphs is Chamber's *Cyclopedia* (1741–1743), the model for Diderot's *Encyclopédie*.

90. For Rousseau's discussion of the supposed cure for tarantula bites through music, see *Essay on the Origin of Languages*, chap. XV, translated above. See also the article "*Tarantule*" in the *Encyclopédie*.

91. Robert Boyle (1627–1691), the great chemist and physicist, also wrote on music and acoustics.

92. Daniel Georg Morhoff (1639–1691) was a philologist who also wrote on music.

93. Athanasius Kircher (1601–1680) was an influential musical theorist and mathematician.

94. For Mersenne, see note 27 above.

95. For Boyle, see note 91 above.

96. John Wallis (1616–1703) was a highly influential English mathematician who also wrote on music, specifically on the phenomenon of resonance and the division of the octave.

97. Pierre-Jean Burette, “Dissertation sur la Mélopée de l’ancienne musique” (1729).

98. Isaac Vossius (1618–1689) was a Dutch theologian, philosopher, and scientist whose *De poematum cantu et viribus rhythmici* was delivered as a lecture at Oxford in 1673.

99. Rousseau appears to refer to his *Essay on the Origin of Languages*, which was not published until after his death.

100. Rousseau presents two tunes published by Kircher in his *Musurgia Universalis* (1650). The first is the beginning of Pindar’s first Pythian Ode, written in 470 B.C. to celebrate the chariot race victory of the tyrant Hiero of Aetna (later of Syracuse), and is now generally thought to be a forgery. The Greek text Rousseau takes from Kircher contains several errors, which have not been corrected in the figures reproduced in the text. The second is an Ode to Nemesis, now attributed to Mesomedes, a contemporary of Hadrian (second century A.D.).

Their translations follow:

*Ode by Pindar*

O golden lyre, jointly possessed by Apollo and  
violet-tressed Muses; which the footstep hears, as it begins the festivities,  
and whose orders the singers obey,  
whenever you make ready with quivering strings to strike up the prelude to  
the chorus leader’s overture.

You lull even the warring thunderbolt [of everlasting fire].

*Hymn to Nemesis*

Nemesis, winged one who tilts life’s balance, dark-eyed  
goddess, daughter of Justice, who checks the proud  
neighing of mortals [with your adamant bit . . .]

101. See Jean-Baptiste du Halde, *Description de la Chine*, 4 vols. (1735), III, 267; Chardin, *Voyages en Perse*, 4 vols. (1735), II, 114; Mersenne, *Harmonie universelle* (1636), II, ii. Mersenne’s source is Jean de Léry, *Histoire d’un voyage fait en la terre de Brésil dite Amérique* (1611), 174, 315, 322.

102. Boethius (fifth century A.D.), *De Institutione Musica*.

103. Pope Gregory the Great (c. 540–604) is credited with developing the plainchant, or “Gregorian chant,” and collecting antiphons, that is, psalms or verses sung responsively.

104. For Guido de Arezzo see note 66 above.

105. Kircher, *Musurgia universalis* (1650), 44.

106. Jehan des Murs (c. 1300–c. 1350) was a widely influential musical theorist of the later Middle Ages best known for his treatment of musical proportions and mensural notation. The major work attributed to him, the *Speculum musicae*, was actually written by Jacques de Liège (c. 1260–c. 1330). The editors have not been able to identify the source of the claim by the Swiss poet and painter Salomon Gessner that Jehan des Murs was English. The claim by Giovanni Andrea Bontempi that Jehan des Murs was Perugian (*Perugino*), like Bontempi himself, instead of Parisian (*Parigino*) is from his *Istoria musica* (1695), 199.

107. Lasus (c. 548–545 B.C.) lived at the court of Hipparchus, tyrant of Athens,

where he composed hymns and dithyrambs. Aristoxenus (fourth century B.C.) was the most important and influential musical theorist of ancient Greece. The major musical works once attributed to the great mathematician Euclid (fourth–third century B.C.), are no longer thought to have been written by him. Aristides Quintilianus (c. second century A.D.) was the author of an important treatise on music that follows the Pythagorean system. Alypius (third or fourth century A.D.) is the fullest source for our knowledge of Greek musical scales. Gaudentius (c. second century A.D.) was a Greek musical theorist. Nicomachus (c. 100 A.D.) was a neo-Pythagorean mathematician and musical theorist. Baccheius Geron (c. third century A.D.) was author of a dialogue on music that largely follows Aristoxenian principles.

108. For Meibom (or Meibomius) see note 54 above.

109. The dialogue *De musica* once attributed to the philosopher and historian Plutarch (first–second century A.D.), is no longer thought to have been written by him. Ptolemy (c. 108–c. 165 A.D.) wrote an important treatise on music. Manuel Bryennius (fourteenth century A.D.) was a Byzantine scholar and musical theorist.

110. Boethius (fifth century A.D.), the philosopher, also wrote on music. Martinian Capella, the author of a didactic treatise on the arts, Aurelianus Cassiodorus, historian and writer on education, and St. Augustine, the great philosopher and theologian, all lived around the fifth century A.D.

111. Gioseffo Zarlino (1517–1590) was an Italian composer and important musical theorist. Francisco de Salinas (1513–1590) was a Spanish organist and musical theorist. Valgulio has not been identified by the editor. Vincenzo Galilei (Rousseau mistakenly writes Galileo) (c. 1520–1591) was a Florentine musical theorist and composer, father of the famous scientist, who was himself also interested in music. Girolamo Mei (b. 1519) was a Florentine humanist and historian of Greek music. Giovanni Battista Doni (1595–1647) was a classicist and musical theorist. Athanasius Kircher (1601–1680) was an influential musical theorist and mathematician. Antoine Parran (1587–1650) was a French composer and musical theorist. Claude Perrault (b. 1613) was a French scientist who wrote on acoustics. John Wallis (1616–1703) was a highly influential English mathematician who also wrote on music, specifically on the phenomenon of resonance and the division of the octave. René Descartes (1596–1650), the great French philosopher, also wrote a work on music. William Holder (1616–1696) was an English mathematician and musician. Pietro Mengoli was an Italian musical theorist of the same period. Alexander Malcolm (1685–1763) was a Scottish mathematician and musical theorist whose work synthesized the work of Kircher, Mersenne, Descartes, and others. Pierre-Jean Burette (1665–1747) was a French author who wrote particularly on ancient Greek music. Francesco Antonio Vallotti (1697–1780) was an Italian composer and musical theorist. Giuseppi Tartini (1692–1770) was an Italian musician, teacher, and musical theorist much admired by Rousseau. Jean-Philippe Rameau (1683–1764) was the most influential French composer and musical theorist of that time. D'Alembert's *Eléments de musique théorique et pratique* (1st ed.; 1752) popularized Rameau's musical theories.

112. Compare to Aristotle, *Poetics*, chaps. 1–3, 1147a9–1148b3.

113. See Aristotle, *Poetics*, chaps. 1–6, 1447a9–1450b20.

114. Rousseau discusses the valets in Molière's comedies in a letter to Georges-Louis Le Sage père (1 July, 1754; Leigh, II.1–3): "If Molière consulted his servant, it is doubtless with respect to the *Medecin malgré lui*, regarding Nicole's sallies and Sosie's and Cléantis' quarrels. But unless Molière's servant was a very extraordinary person, I would indeed wager that this great man did not consult him with regard to *Misanthrope* nor *Tartuffe*, nor concerning the beautiful scene between Alcmène and Amphitryon." For a discussion of these comedies, see Rousseau's *Letter to d'Alembert on the Theatre* (Bloom, 34–46, and on the valets in particular, 36). Pradon (c. 1632–c. 1698) was a French tragic dramatist of the late eighteenth century who was often compared critically to Corneille, his great contemporary.

115. "*Merveilleux*" is a term often used in discussing classical French opera, and refers to the supernatural or magical element so often used in such operas and employed by means of elaborate stage machinery.

116. Apostolo Zeno (1668–1750) was an Italian librettist and literary scholar who began a reform in the form and content of the libretto which separated the spheres of drama and music. His "student" was Pietro Metastasio (1698–1782), the Italian poet and very popular librettist who succeeded Zeno at the Imperial Court in Vienna.

117. For Vinci, Leo, and Pergolesi, see note 19 above.

118. The Fairs were annual fairs at which theater troupes gave plays.

119. This paragraph and the previous one are variations of passages in the article IMITATION [*Imitation*], translated above, as well as in the *Essay on the Origin of Languages*, chap. XVI, translated above.

120. "Opera buffa" originated as a two-act play inserted between the three acts of a tragic opera and was gradually performed on its own.

121. *Dictionnaire de l'Académie française* (4th ed.; 1762), s.v. "Récitatif."

122. Nicola Porpora (1686–1768) was a Neopolitan composer of vocal music and opera.

123. Tartini, *Trattato di musica secondo la vera scienza* (1754). Here is a more literal translation of the passage:

In the fourteenth year of this century in the Drama which was performed in Ancona there was at the beginning of the third Act a line of Recitative, not accompanied by any instrument other than the Bass, by which, as much in our professors as in every other listener, was produced such and so much a commotion of the soul, which everyone looking into one another's faces could see by the evident change of color it produced in all of ours. The effect was not of plaints (I well remember that the speech was of anger [or: contempt]); but of a certain rigor and chilling in the blood which caused the soul's turmoil. Thirteen times the Drama was performed, and every time the same effect universally followed; of which a palpable sign of the advent of this high point was the silence with which every Listener awaited to to enjoy the effect.

124. Theon of Smyrna (second century A.D.), *Mathematics Useful for Reading Plato*, II.xii. Lasus of Hermione (c. 548–545 B.C.) was a pioneering poet and composer of hymns and dithyrambs; Hipassus of Metapontum was an early Pythagorean.

125. Nicomachus, *Enchiridion*, chap. 6 (Barker, II, 256); Censorinus (third century A.D.), *De die natali*, X.viii.

126. Vincenzo Galilei, *Dialogo della musica antica e moderna* (1602), 104.

127. Rameau, *Génération harmonique*, 8 ff. (Jacobi, III, 18 ff.).

128. Pietro Mengoli, *Speculazioni di musica* (1670), Speculatione quarta.

129. Jean-Jacques Dortous de Mairan, “Discours sur la Propagation du Son dans les différent Tons qui le modifient,” *Histoire de l’Académie Royale des Sciences* (1737; publ. 1740).

130. Rousseau takes Halley’s and Flamstead’s report from Diderot, “Principes généraux d’acoustique,” the first of his *Mémoires sur différens sujets de mathématiques* (1748). La Condamine’s report comes from his *Relation abrégée d’un voyage fait à l’intérieur de l’Amérique méridionale* (1745). A toise is about six and one half feet. Pierre Gassendi’s and Marin Mersenne’s experiment is from Gassendi, *Syntagmatici Philosophici* (1658), 418. William Derham’s experiments are recounted in his “Experimenta et Observationes de Soni Motu aliisque ad id attinentibus,” *Philosophical Transactions* (1708), no. 313, art.1, and taken by Rousseau from Diderot’s “Principes généraux d’acoustique” (1748; published as the first of his *Mémoires sur différens sujets de mathématiques*), 239.

131. Leonhard Euler, *Tentamen novae theoriae musicae, ex certissimis harmoniae principii dilucide expositae* (1739), as reported by Diderot, “Principes généraux d’acoustique” (1748; published as the first of his *Mémoires sur différens sujets de mathématiques*).

132. Abbé Sébastien de Brossard, *Dictionnaire de musique, contenant une explication des termes grecs, latins, italiens, et françois* (1703).

133. “Aspect” translates “air,” which can also mean “tune.”

134. “Strings” translates “cordes,” which can also be translated “pitches.” One unaltered string produces one principal pitch.

135. Ptolemy (c. 108–165 A.D.) was an astronomer, mathematician, and musical theorist. Didymus (c. 63 B.C.–10 A.D.) was a grammarian and musical theorist. Both were discussed by Brossard in his *Dictionnaire de musique*, s.v. “Temperamento.”

136. Guido of Arezzo (c. 991–c.1033), one of the most influential musical theorists of the Middle Ages, as cited by Athanasius Kircher, *Musurgia universalis* (1650), 215.

137. Mersenne, *Harmonie universelle* (1636); Étienne Loulié, *Nouveau système de musique ou nouvelle division de moncorde* (1698), cited by Brossard, *Dictionnaire de musique*, s.v. “Temperamento.” Rameau discusses his theory of temperament at length in his *Génération harmonique* (1737), chap. 7 (Jacobi, III, 52–66).

138. Rameau, *Nouveau système de musique théorique* (1726), 107 ff. (Jacobi, II, 117 ff.).

139. Rameau, *Génération harmonique* (1737), 94 ff. (Jacobi, III, 61 ff.).

140. François Couperin, “le Grand” (1668–1733), French organist and composer of music for harpsichord and of sacred music. Mersenne, *Harmonie universelle* (1646), Book I, prop. xiv. Jean Gallé was a mathematician who was contracted in 1636 to teach the Liège organ-builder André Severin how to construct a keyboard with equal temperament (see Mersenne, *Harmonie universelle*, Book III, props. i, viii).

141. “Beats” translates “*battements*.” See note 25 above.
142. Mersenne, *Harmonie universelle* (1636), Book I, prop. xiv.
143. Rousseau appears to refer to Joseph-François Duché de Vancy (1668–1704), a tragic poet and composer.
144. See note 26 to *The Principle of Melody*, translated above.
145. See *Letter on French Music*, pp. 154–156 above. Rousseau’s *Devin du village* was produced in 1752, and the *Letter on French Music*, which was written around the beginning of 1753, was published in November 1753.
146. Charles Duclos’ article “Déclamation des anciens” is found in vol. 4 of the *Encyclopedia* (1754), 686–691. The citation is from p. 688.
147. Denis Dodart (1634–1707) was a French physician and academician who wrote on music. The reference is to his “Mémoire sur les causes de la voix humaine, et de ses différens tons,” *Mémoires de l’Académie royal des sciences* (1700), 244–293.
148. The Concert Spirituel was the annual concert given at the Tuilleries palace. The Opera refers to the Paris Opera.
149. Rousseau alludes to the famous Venetian *Scuole* or *ospidale*, hospices for young women who were trained in music. Rousseau recounts a visit to one of the four *ospidale* in his *Confessions*, VII, (*Collected Writings*, V, 264–265).
150. Baldassare Ferri (1610–1680) was an Italian castrato who sang largely in Poland and Austria. He was eulogized by the great castrato, composer, and musical theorist Giovanni Andrea Bontempi, in whose works Rousseau probably read about Ferri.